Final

Site Investigation Report
DRMO Area, Parcel 85(7)

Fort McClellan
Calhoun County, Alabama

Prepared for:

U.S. Army Corps of Engineers, Mobile District
109 St. Joseph Street
Mobile, Alabama 36602

Prepared by:

IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923

Task Order CK05
Contract No. DACA21-96-D-0018
IT Project No. 774645

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Revision 0

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See Attachment 1 - List of Abbreviations and Acronyms.

Executive Summary

In accordance with Contract Number DACA21-96-D-0018, Task Order CK05, IT Corporation completed a site investigation (SI) at the Defense Reutilization Marketing Office (DRMO) Area, Parcel 85(7), at Fort McClellan in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site and, if present, whether the concentrations would present an unacceptable risk to human health or the environment. The SI at the DRMO Area, Parcel 85(7), consisted of the sampling and analyses of nine surface soil samples, nine subsurface soil samples, six groundwater samples, five surface water samples, and five sediment samples. In addition, six temporary groundwater monitoring wells were installed in the residuum groundwater zone to facilitate groundwater sample collection and to provide site-specific geological and hydrogeological characterization information.

The analytical results indicate that metals, volatile organic compounds, semivolatile organic compounds, chlorinated pesticides, and chlorinated herbicides were detected in the environmental media sampled. Polychlorinated biphenyls and organophosphorus pesticides were not detected in any of the media sampled. To evaluate whether the detected constituents present an unacceptable risk to human health or the environment, the analytical results were compared to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for Fort McClellan.

The potential impact to human receptors is expected to be minimal. Although the site is projected for use as an industrial area, the soils and groundwater data were screened against residential human health SSSLs to evaluate the site for possible unrestricted future use. The metals that exceeded human health SSSLs, with a few exceptions, were within background concentrations or the range of background values, and thus, do not pose an unacceptable risk to future human receptors. The polynuclear aromatic hydrocarbon (PAH) compound benzo(a)pyrene was detected in four surface soil samples at concentrations exceeding the SSSL but below the PAH background value. The benzo(a)pyrene concentration exceeded the SSSL at one subsurface soil sample location but was below the PAH background value.

The volatile organic compound carbon tetrachloride was detected in one groundwater sample at a concentration exceeding the residential human health SSSL but below the U.S. Environmental

Protection Agency drinking water standard. Carbon tetrachloride was not detected in any of the other wells installed at Parcel 85 (including two upgradient wells and four downgradient wells installed at adjacent parcels). The extent of the carbon tetrachloride contamination is defined horizontally and is localized in the area of PPMP-85-GP09. Based on the low level and limited spatial distribution, carbon tetrachloride is not expected to pose a threat to human health.

Several metals were detected in site media at concentrations exceeding ESVs and background concentrations. In addition, the concentrations of several semivolatile organic compounds and a limited number of pesticides and herbicides exceeded ESVs in site media. However, the potential impact to ecological receptors is expected to be minimal based on site conditions. The site is asphalt-paved and fenced and is located in a well-developed area projected for industrial use. The site does not support viable ecological habitat. Consequently, the threat to potential ecological receptors is expected to minimal.

Based on the results of the SI, past operations at the DRMO Area, Parcel 85(7), do not appear to have adversely impacted the environment. The metals and organic compounds detected in site media do not pose an unacceptable risk to human health or the environment. Therefore, IT Corporation recommends "No Further Action" and unrestricted land reuse at the DRMO Area, Parcel 85(7).

1.0 Introduction

The U.S. Army has selected Fort McClellan (FTMC) located in Calhoun County, Alabama, for closure by the Base Realignment and Closure (BRAC) Commission under Public Laws 100-526 and 101-510. The 1990 Base Closure Act, Public Law 101-510, established the process by which U.S. Department of Defense (DOD) installations would be closed or realigned. The BRAC Environmental Restoration Program requires investigation and cleanup of federal properties prior to transfer to the public domain. The U.S. Army is conducting environmental studies of the impact of suspected contaminants at parcels at FTMC under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE contracted with IT Corporation (IT) to provide environmental services for the site investigation (SI) of the Defense Reutilization Marketing Office (DRMO) Area, Parcel 85(7), under Contract Number DACA21-96-D-0018, Task Order CK05.

This SI report presents specific information and results compiled from the SI, including field sampling and analysis and monitoring well installation activities, conducted at the DRMO Area, Parcel 85(7).

1.1 Project Description

The DRMO Area was identified as an area to be investigated prior to property transfer. The DRMO Area, Parcel 85(7), was classified as a Category 7 site in the environmental baseline survey (EBS) (Environmental Science and Engineering, Inc. [ESE], 1998). Category 7 sites are areas that are not evaluated and/or that require further evaluation.

A site-specific field sampling plan (SFSP) attachment (IT, 1998a) and a site-specific safety and health plan (SSHP) attachment were finalized in December 1998. The SFSP and SSHP were prepared to provide technical guidance for sample collection and analysis at the DRMO Area, Parcel 85(7). The SFSP was used in conjunction with the SSHP as attachments to the installation-wide work plan (IT, 1998b) and the installation-wide sampling and analysis plan (SAP) (IT, 2000a). The SAP includes the installation-wide safety and health plan and quality assurance plan.

The SI included field work to collect nine surface soil samples, nine subsurface soil samples, six groundwater samples, five surface water samples, and five sediment samples to determine if potential site-specific chemicals are present at the DRMO Area, Parcel 85(7), and to provide data useful for supporting any future corrective measures and closure activities.

1.2 Purpose and Objectives

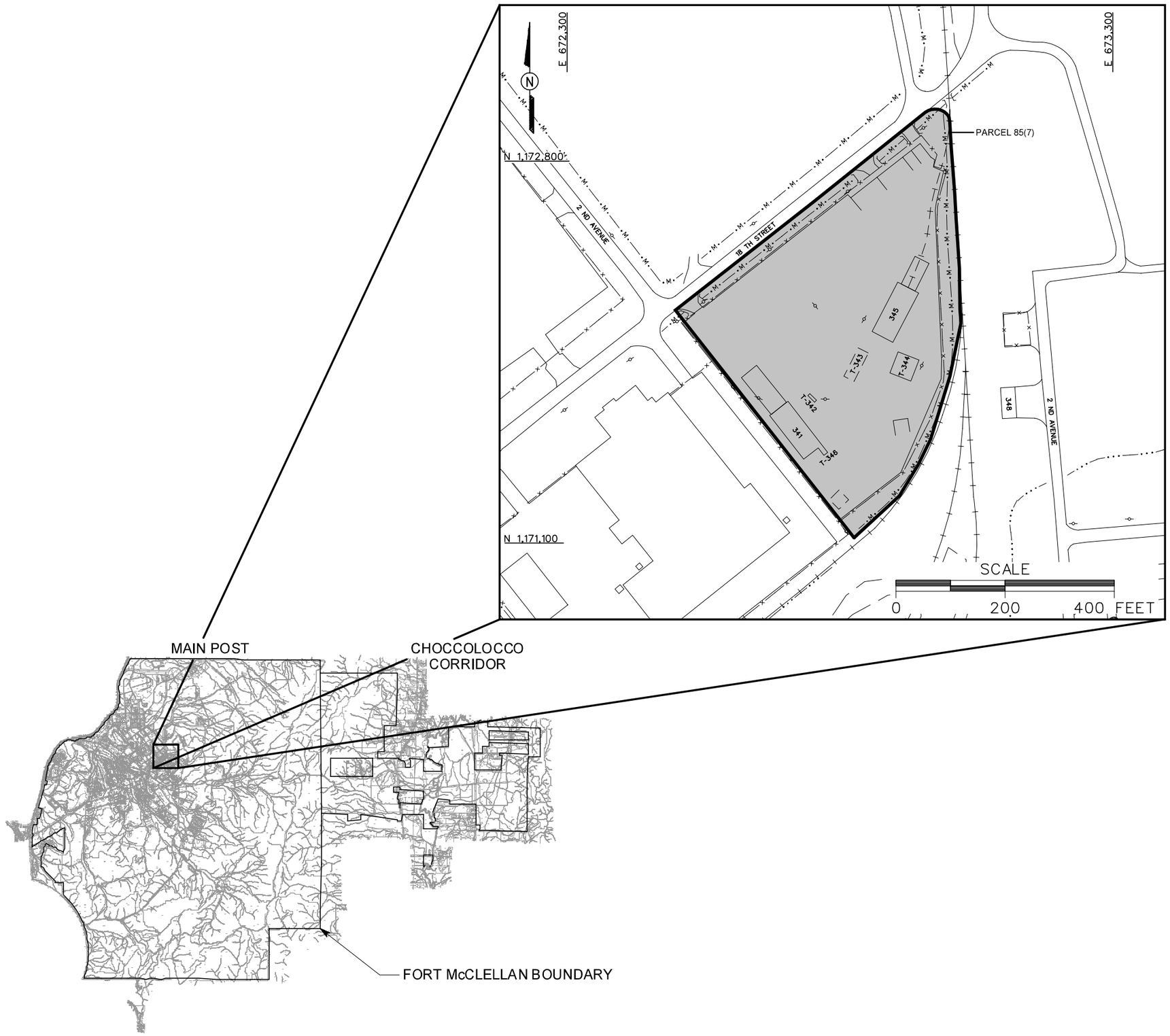
The SI program was designed to collect data from site media and provide a level of defensible data and information in sufficient detail to determine whether chemical constituents are present at the DRMO Area, Parcel 85(7), at concentrations that would present an unacceptable risk to human health or the environment. The conclusions of the SI in Chapter 6.0 are based on the comparison of the analytical results to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC. The SSSLs and ESVs were developed by IT as part of the human health and ecological risk evaluations associated with SIs being performed under the BRAC Environmental Restoration Program at FTMC. The SSSLs, ESVs, and polynuclear aromatic hydrocarbon (PAH) background screening values are presented in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000b). The PAH background screening values were developed by IT at the direction of the BRAC Cleanup Team to address the occurrence of PAH compounds in surface soils as a result of anthropogenic activities at FTMC. Background metals screening values are presented in the *Final Background Metals Survey Report, Fort McClellan, Alabama* (Science Applications International Corporation [SAIC], 1998).

Based on the conclusions presented in this SI report, the BRAC Cleanup Team will decide to propose "No Further Action" at the site or to conduct additional work at the site.

1.3 Site Description and History

The DRMO Area, Parcel 85(7), is located near the east end of 18th Street on the Main Post of FTMC (Figure 1-1). The site is adjacent to and directly northeast of Building 350 (Consolidated Maintenance Facility, located on 18th Street). The site encompasses approximately 6 acres, and contains Buildings 341 through 346 (except Building 343, which has been removed), and outside storage bins for scrap materials (Figure 1-2). The DRMO facility is reported to have been a satellite storage operation for the disposal of FTMC materials and equipment that was managed through the nearby Anniston Army Depot. The DRMO Area, Parcel 85(7), originally had a gravel surface; however, the site was paved sometime after 1990. The site is surrounded by a chain-link fence. Previously, a rail spur entering the site through the northeast gate was located along the north side of Building 345 and Building 343 (Figure 1-2).

The DRMO Area, Parcel 85(7), received hazardous materials and hazardous wastes for short-term storage until 1985. After 1985, waste oil, antifreeze, and waste fuels were not handled at the DRMO



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TREES / TREELINE
- PARCEL BOUNDARY
- BRIDGE
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- RAILROAD
- UTILITY POLE

FIGURE 1-1
SITE LOCATION MAP
DRMO AREA
PARCEL 85(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

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PARCEL 85(7)

CONCRETE WALL BINS FOR SCRAP MATERIALS

WET WEATHER MARSH AREA

FORMER LOCATION OF RAIL SPUR

CONCRETE PAD

PAVED

CONCRETE PAD

SCALES

LOADING RAMP

PAVED

APPROXIMATE LOCATION OF CLOSED INTERIM STATUS STORAGE FACILITY EXCAVATION

18 TH STREET

FLOW DIRECTION

FLOW DIRECTION

2 ND AVENUE

2 ND AVENUE

800

800

800

T-342

T-343

T-344

T-346

341

345

348

350

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- FORMER BUILDING LOCATION
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- MARSH / WETLANDS
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- RAILROAD
- UTILITY POLE

SCALE

0 100 200 FEET

FIGURE 1-2
SITE MAP
DRMO AREA,
PARCEL 85(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

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Area, Parcel 85(7). According to ESE (1998), the following nonhazardous materials and equipment were managed at this facility after 1985:

- Old appliances
- Furniture
- Clothes
- Empty and cleaned drums
- Miscellaneous containers
- Brass ammunition shell casings
- Ammunition boxes
- Old tires
- Scrap metal
- Plastic
- Lumber
- Surplus vehicles
- Surplus machinery and equipment.

Most items were stored on wood pallets or directly on asphalt. Brass shell casings and scrap metals were kept in metal bins. Buildings 341 and 345 were warehouses used for dry storage.

The DRMO Area, Parcel 85(7), was identified as a solid waste management unit at FTMC (ESE, 1998). Prior to 1985, a Resource Conservation and Recovery Act (RCRA) interim status storage facility was identified near Building 346 and used for short-term storage of hazardous materials and hazardous wastes, including pesticides, solvents, corrosives, batteries, and petroleum, oils, and lubricants. The storage facility provided secondary containment for overpacking hazardous wastes prior to shipment to a permitted facility.

The storage facility consisted of two fiberglass CONEX storage boxes positioned on top of two interlocking aluminum panels. The interlocking panels formed a flooring pad that measured approximately 15 feet by 36 feet (Roy F. Weston, Inc., 1990). The storage facility was located south of Building 346 in the southern corner of the DRMO Area (Figure 1-2).

In 1985, soils at the RCRA interim status storage facility were sampled and found to contain low concentrations of various semivolatile organic compounds (SVOC) (Table 1-1). The U.S. Army Environmental Hygiene Agency (USAEHA) concluded that a release had occurred and recommended further investigation (USAEHA, 1986). Another report indicated that stained/contaminated soil was present near the transformer storage area and the scrap metal storage area (ESE, 1998).

Table 1-1

Summary of Detected Analytes for the Soil Sample Data[a]
1985 Soil Investigation at the RCRA Interim Status Storage Facility
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Number		005	006	007		
Sample Matrix		Soil	Soil	Soil		
Collection Date		12/85	12/85	12/85	Detection Limit	RBC[b]
Parameter	**Units**				(µg/g)	(mg/kg)
Pentachlorophenol	µg/g	BDL	3	14	2.5	5.30
2,4,6-trichlorophenol	µg/g	BDL	5	72	2.5	58.0
Benzo(b)fluoranthene	µg/g	TRC	4	BDL	1.0	0.88
Benzo(g,h,i)perylene	µg/g	TRC	1	TRC	2.5	2,300
Benzo(k)fluoranthene	µg/g	TRC	4	BDL	1.0	8.8
Diethyl phthalate	µg/g	1	TRC	BDL	1.0	63,000
Fluoranthene	µg/g	TRC	2	BDL	1.0	3,100
Naphthalene	µg/g	TRC	TRC	2	1.0	3,100
Phenanthrene	µg/g	TRC	1	2	1.0	2,300
Pyrene	µg/g	TRC	2	BDL	1.0	2,300

[a]U.S. Army Environmental Hygiene Agency (USAEHA), 1986, *Hazardous Waste Consultation No. 37-26-1649-87, Fort McClellan, Alabama,* December 8-12.

[b]U.S. Environmental Protection Agency (EPA), Region III, 1997, *Risk-Based Concentrations for Residential Soil Ingestion* , October 22.

µg/g - Micrograms per gram.
mg/kg - Milligrams per kilogram.
BDL - Below detection limit.
TRC - Constituent detected, but below quantifiable limits.
RBC - Risk-based concentration for residential exposure scenario (EPA Region III RBC Tables; October 22, 1997).

Roy F. Weston, Inc. (1990) indicated that the DRMO Area had a lead-acid battery storage area on a gravel pad at Building 344, and an outdoor transformer storage area near the entrance of the site. The battery storage area was still in existence in October 1992 (ESE, 1998). The DRMO Area was paved with asphalt sometime after 1990. Evidence of the transformer storage area or battery storage area near Building 344 was not observed during an IT site visit in June 1998.

The RCRA Interim Status Storage Facility was remediated and closed by FTMC in 1992. Closure activities included sampling and analysis of soils for RCRA waste parameters; excavating contaminated soils; backfilling the excavation with clean fill; and sampling and analysis of confirmatory closure samples. On September 23, 1992, the Alabama Department of Environmental Management (ADEM) granted approval of satisfactory clean closure of the RCRA Interim Status Storage Facility (ESE, 1998).

Storm water drainage along the north and east borders of the DRMO, Parcel 85(7), empties to the north and west into intermittent tributaries of Cave Creek. A wet weather marsh area is located between the fence and the railroad tracks along the storm drainage on the east side of the site.

The site elevation is approximately 800 feet above mean sea level.

2.0 Previous Investigations

An EBS was conducted by ESE to document current environmental conditions of all FTMC property (ESE, 1998). The study was to identify sites that, based on available information, have no history of contamination and comply with DOD guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by seven criteria:

1. Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas)

2. Areas where only release or disposal of petroleum products has occurred

3. Areas where release, disposal, and/or migration of hazardous substances has occurred, but at concentrations that do not require a removal or remedial response

4. Areas where release, disposal, and/or migration of hazardous substances has occurred, and all removal or remedial actions to protect human health and the environment have been taken

5. Areas where release, disposal, and/or migration of hazardous substances has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken

6. Areas where release, disposal, and/or migration of hazardous substances has occurred, but required actions have not yet been implemented

7. Areas that are not evaluated or require additional evaluation.

The EBS was conducted in accordance with the Community Environmental Response Facilitation Act (Community Environmental Response Facilitation Act-Public Law 102-426) protocols and DOD policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, ADEM, the U.S. Environmental Protection Agency (EPA) Region IV, and Calhoun County, as well as a database search of Comprehensive Environmental Response, Compensation, and Liability Act-regulated substances, petroleum products, and RCRA-regulated facilities. Available historic maps and aerial photographs were reviewed to document historic land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were

conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels. Previous investigations have been conducted at the DRMO Area, Parcel 85(7), as described in the following paragraphs.

The RCRA Interim Status Storage Facility located in the southern corner of the DRMO Area was remediated and closed in 1992 by FTMC. Closure involved sampling and analyzing soils for investigative RCRA waste parameters, removing contaminated soils, and backfilling the excavation with clean fill.

In 1985, soil samples were collected adjacent to the aluminum panel flooring of the RCRA Interim Status Storage Facility. The samples were analyzed for various chemical parameters including pesticides, polychlorinated biphenyls (PCB), and SVOCs. The results of the analyses indicated that pentachlorophenol, 2,4,6-trichlorophenol, naphthalene, phenanthrene, and other SVOCs were detected at low concentrations (USAEHA, 1986). The detected compounds and concentrations are listed in Table 1-1. The locations of the samples at the storage facility were not identified in the USAEHA report.

A closure plan was prepared by FTMC and approved by ADEM for the closure of the RCRA Interim Status Storage Facility at the DRMO Area. In May 1990, the CONEX boxes and the aluminum panel flooring were removed, and the soil under the storage facility was excavated to approximately 4 feet below ground surface (bgs). Three composite soil samples were collected from the bottom of the excavation and submitted for analysis for the following parameters:

- Volatile organic compounds (VOC)
- SVOCs
- Organochlorine pesticides and aroclors
- Chlorinated herbicides
- Extraction procedure toxicity metals
- Total cyanide
- Reactivity
- Corrosivity
- Ignitability.

Only one sample had detectable levels of any contaminants: the Area "A" sample contained methylene chloride at a concentration of 14 parts per billion. Table 2-1 is a summary of VOC analytical data generated from the three soil samples collected as part of the RCRA investigation.

Table 2-1

Summary of Volatile Compounds for Soil Sample Data
1990 Soil Investigation at the RCRA Interim Status Storage Facility
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Compound	MDL (ppb)	Concentration (ppb)
Chloromethane	10	<MDL
Bromomethane	10	<MDL
Vinyl chloride	10	<MDL
Chloroethane	10	<MDL
Methylene chloride	5	14
2-Propanone (Acetone)	100	*
Carbon disulfide	5	<MDL
1,1-Dichloroethene	5	<MDL
1,1-Dichloroethane	5	<MDL
trans-1,2-Dichloroethene	5	<MDL
Chloroform	5	<MDL
1,2-Dichloroethane	5	<MDL
2-Butanone (MEK)	100	<MDL
1,1,1-Trichloroethane	5	<MDL
Carbon tetrachloride	5	<MDL
Vinyl acetate	50	<MDL
Bromodichloromethane	5	<MDL
1,2-Dichloropropane	5	<MDL
trans-1,2-Dichloethene	5	<MDL
Trichloroethene	5	<MDL
Dibromochloromethane	5	<MDL
1,1,2-Trichloroethane	5	<MDL
Benzene	5	<MDL
2-Chloroethylvinylether	5	<ND
cis-1,3-Dichloropropene	10	<MDL
Bromoform	5	<MDL
2-Hexanone	50	<MDL
4-Methyl-2-pentanone	50	<MDL
Tetrachloroethene	5	<MDL
1,1,2,2-Tetrachloroethane	5	<MDL
Toluene	5	<MDL
Chlorobenzene	5	<MDL
Ethyl benzene	5	<MDL
Total xylenes	5	<MDL
Styrene	5	<MDL

* Presence indicated, but less than method detection limit.
MDL – Method detection limit.
ND – Not determined.
ppb – Parts per billion.

Because methylene chloride was detected in the soil sample at the storage facility, ADEM requested in a March 16, 1992 letter that FTMC collect background soil samples in an area unaffected by the RCRA Interim Status Storage Facility for comparison to the soil data showing methylene chloride. The background samples were collected by FTMC on March 19, 1992 and submitted for methylene chloride analysis. Methylene chloride was not detected in any of the four background samples. Therefore, ADEM required that additional samples be collected at the RCRA Interim Status Storage Facility excavation to determine the presence of methylene chloride at the site.

On May 5, 1992, FTMC removed the fill dirt from the original excavation to an approximate depth of 4 feet bgs. Soil samples were collected at a depth of 6 inches below the excavation floor in the same area where the Area "A" sample was originally collected. Four samples were collected and submitted for analysis to the USACE South Atlantic Division Laboratory. The analytical results indicated that methylene chloride concentrations in all samples were less than the detection limit of 1 part per billion (Table 2-2). The locations of these samples were not available. On September 23, 1992, ADEM granted approval of satisfactory clean closure of the RCRA Interim Status Storage Facility.

Based on the available history of the site, this is the only investigation that has been performed at the DRMO Area.

Table 2-2

Soil Sample Data[a] for the Clean Closure of the RCRA Interim Status Storage Facility DRMO Area, Parcel 85(7) Fort McClellan, Calhoun County, Alabama

Sample Number	Sample ID	Sample Date	Approximate Sample Depth (feet bgs)	Methylene Chloride Concentration (ppb)
13369	FTMC-5001-0001	5/2/92	4.5	<1
13370	FTMC-5001-0002	5/2/92	4.5	<1
13371	FTMC-5001-0003	5/2/92	4.5	<1
13372	FTMC-5001-00QA	5/2/92	4.5	<1

[a]Department of Army, Major General Robert D. Orton, 1992, *Closure of Interim Status Storage Facility, USEPA Identification Number AL4 210 020 562,* Communication to Mr. Steven O. Jenkins, RCRA Compliance Branch, Alabama Department of Environmental Management, August.

bgs -Below ground surface.
ppb - Parts per billion.

3.0 Current Site Investigation Activities

This chapter summarizes SI activities conducted by IT at the DRMO Area, Parcel 85(7), including environmental sampling and analysis, and groundwater monitoring well installation activities.

3.1 Environmental Sampling

The environmental sampling performed during the SI at the DRMO Area, Parcel 85(7), included the collection of surface soil samples, subsurface soil samples, surface water samples, sediment samples, and groundwater samples for chemical analyses. The sample locations were determined by observing site physical characteristics noted during a site walkover, and by reviewing historical documents pertaining to activities conducted at the site. The sample locations, media, and rationale are summarized in Table 3-1. Sampling locations are shown on Figure 3-1. Samples were submitted for laboratory analyses of site-related parameters listed in Section 3.3.

3.1.1 Surface Soil Sampling

Surface soil samples were collected from nine locations at the DRMO Area, Parcel 85(7), as shown on Figure 3-1. Soil sampling locations and rationale are presented in Table 3-1. Sample designations and quality assurance/quality control (QA/QC) samples are listed in Table 3-2. Soil sampling locations were determined in the field by the on-site geologist based on sampling rationale, presence of surface structures, site topography, and buried utilities.

Sample Collection. Surface soil samples were collected from the upper 2 feet of soil by either direct-push technology or with a 3-inch diameter stainless-steel hand auger using the methodology specified in Section 4.9.1.1 of the SAP (IT, 2000a). Surface soil samples were collected by first removing asphalt pavement from the immediate sample area. The soil was then collected with the sampling device and screened with a photoionization detector (PID) in accordance with Section 4.7.1.1 of the SAP. Samples for VOC analyses were collected directly from the sampler with three EnCore® samplers. The remaining portion of the sample was transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.3. Sample collection logs are included in Appendix A.

Table 3-1

Sampling Locations and Rationale
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
PPMP-85-GP01	Surface soil Subsurface soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected in the south corner of the site near the closed RCRA Interim Status Storage Facility excavation.
PPMP-85-GP02	Surface soil Subsurface soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected in the low area in front of the loading dock beneath stained area on pavement.
PPMP-85-GP03	Surface soil Subsurface soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected through pavement in the heavy staining area downgradient of the concrete pad at the north end of Building 341.
PPMP-85-GP04	Surface soil Subsurface soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected at the edge of the site beneath stained pavement, downgradient of the center of the site. Boring is downgradient of the possible location of a former transformer storage area near the entrance.
PPMP-85-GP05	Surface soil Subsurface soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected at the west end of the concrete scrap storage bins beneath heavy surface staining on the pavement from drainage along open side (south side) of storage bins.
PPMP-85-GP06	Surface soil Subsurface soil	Surface soil and subsurface soil samples were collected in front of the open side of the concrete scrap storage bins beneath surface drainage stains on pavement.
PPMP-85-GP07	Surface soil Subsurface soil	Surface soil and subsurface soil samples were collected near the northeast corner of Building 344 beneath heavy staining on the pavement, possibly near past storage site of batteries.
PPMP-85-GP08	Surface soil Subsurface soil	Surface soil and subsurface soil samples were collected in the center of the site near old railroad spur located on north side of Building 345 and previous location of Building 343.
PPMP-85-GP09	Surface soil Subsurface soil Groundwater	Surface soil, subsurface soil, and groundwater samples were collected between the northwest corner of Building 341 and the west fence.
PPMP-85-SW/SD01	Surface water Sediment	Surface water and sediment samples were collected in the storm drain on the east side of the site which is a downgradient sink at the site. Evidence of any migration from within the site would likely be reflected at this location.
PPMP-85-SW/SD02	Surface water Sediment	Surface water and sediment samples were collected in a wet-weather marsh area along the east side of site which is a downgradient sink at the site.
PPMP-85-SW/SD03	Surface water Sediment	Surface water and sediment samples were collected at the south end of a wet-weather marsh along the east side of the site which is a downgradient sink at the site. Evidence of any migration from within the site would likely be reflected at this location.
PPMP-85-SW/SD04	Surface water Sediment	Surface water and sediment samples were collected from the ditch in the southern corner of the parcel.
PPMP-85-SW/SD05	Surface water Sediment	Surface water and sediment samples were collected along the east-west ditch at the site.

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PARCEL 85(7)

PPMP-85-SW/SD05

PPMP-85-GP06

PPMP-85-GP05

PPMP-85-SW/SD01

PPMP-85-GP04

PPMP-85-SW/SD02

PPMP-85-GP08

PPMP-85-GP03

PPMP-85-GP07

PPMP-85-GP09

PPMP-85-GP02

PPMP-85-SW/SD03

PPMP-85-GP01

PPMP-85-SW/SD04

A

A'

CONCRETE WALL BINS FOR SCRAP MATERIALS

WET WEATHER MARSH AREA

FORMER LOCATION OF RAIL SPUR

CONCRETE PAD

PAVED

SCALES

LOADING RAMP

APPROXIMATE LOCATION OF CLOSED INTERIM STATUS STORAGE FACILITY EXCAVATION

2 ND AVENUE

18 TH STREET

FLOW DIRECTION

T-342

T-343

T-344

T-346

345

348

341

350

800

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- FORMER BUILDING LOCATION
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- MARSH / WETLANDS
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- RAILROAD
- UTILITY POLE
- SURFACE WATER/SEDIMENT SAMPLE LOCATION
- SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- A A' CROSS SECTION LOCATION

SCALE

0 100 200 FEET

FIGURE 3-1
SAMPLE LOCATION MAP
DRMO AREA,
PARCEL 85(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
A Member of The IT Group

Table 3-2

Surface and Subsurface Soil Sample Designations and QA/QC Samples
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft. bgs)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
PPMP-85-GP01	PPMP-85-GP01-SS-KN0001-REG	0-1	PPMP-85-GP01-SS-KN0002-FD	PPMP-85-GP01-SS-KN0003-FS		TCL VOCs, TCL SVOCs, TAL Metals, PCBs
	PPMP-85-GP01-DS-KN0004-REG	3-6				Cl Pesticides/Herbicides,OP Pesticides
PPMP-85-GP02	PPMP-85-GP02-SS-KN0005-REG	0.5-1.5			PPMP-85-GP02-SS-KN0005-MS	TCL VOCs, TCL SVOCs, TAL Metals, PCBs
	PPMP-85-GP02-DS-KN0006-REG	1.5-3			PPMP-85-GP02-SS-KN0005-MSD	Cl Pesticides/Herbicides,OP Pesticides
PPMP-85-GP03	PPMP-85-GP03-SS-KN0007-REG	1-2				TCL VOCs, TCL SVOCs, TAL Metals, PCBs
	PPMP-85-GP03-DS-KN0008-REG	4-5				Cl Pesticides/Herbicides,OP Pesticides
PPMP-85-GP04	PPMP-85-GP04-SS-KN0009-REG	1-2				TCL VOCs, TCL SVOCs, TAL Metals, PCBs
	PPMP-85-GP04-DS-KN0010-REG	5-6				Cl Pesticides/Herbicides,OP Pesticides
PPMP-85-GP05	PPMP-85-GP05-SS-KN0011-REG	1-2				TCL VOCs, TCL SVOCs, TAL Metals, PCBs
	PPMP-85-GP05-DS-KN0012-REG	3-6				Cl Pesticides/Herbicides,OP Pesticides
PPMP-85-GP06	PPMP-85-GP06-SS-KN0013-REG	1-2				TCL VOCs, TCL SVOCs, TAL Metals, PCBs
	PPMP-85-GP06-DS-KN0014-REG	2-5				Cl Pesticides/Herbicides,OP Pesticides
PPMP-85-GP07	PPMP-85-GP07-SS-KN0015-REG	1-2				TCL VOCs, TCL SVOCs, TAL Metals, PCBs
	PPMP-85-GP07-DS-KN0016-REG	2-5				Cl Pesticides/Herbicides,OP Pesticides
PPMP-85-GP08	PPMP-85-GP08-SS-KN0017-REG	1-2				TCL VOCs, TCL SVOCs, TAL Metals, PCBs
	PPMP-85-GP08-DS-KN0018-REG	2-5				Cl Pesticides/Herbicides,OP Pesticides
PPMP-85-GP09	PPMP-85-GP09-SS-KN0019-REG	0.5-1.5				TCL VOCs, TCL SVOCs, TAL Metals, PCBs
	PPMP-85-GP09-DS-KN0020-REG	2.5-4				Cl Pesticides/Herbicides,OP Pesticides

Cl - Chlorinated
FD - Field duplicate
FS - Field split
ft. bgs - Feet below ground surface.
MS/MSD - Matrix spike/matrix spike duplicate.
OP - Organophosphorus
PCB - Polychlorinated biphenyl.
QA/QC - Quality assurance/quality control.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
TOC - Total organic carbon.
VOC - Volatile organic compound.

3.1.2 Subsurface Soil Sampling

Subsurface soil samples were collected from nine soil borings at the DRMO Area, Parcel 85(7), as shown on Figure 3-1. Subsurface soil sampling locations and rationale are presented in Table 3-1. Subsurface soil sample designations, depths, and QA/QC samples are listed in Table 3-2. Soil boring sampling locations were determined in the field by the on-site geologist based on sampling rationale, presence of surface structures, site topography, and buried and overhead utilities. IT contracted TEG, Inc., a direct-push technology subcontractor, to assist in subsurface soil sample collection.

Sample Collection. Subsurface soil samples were collected from soil borings at depths greater than 2 feet bgs in the unsaturated zone. The soil borings were advanced and soil samples collected using the direct-push sampling procedures specified in Section 4.9.1.1 of the SAP (IT, 2000a). The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.3. Sample collection logs are included in Appendix A.

Soil samples were collected continuously until direct-push sampler refusal was encountered. Subsurface soil samples were field screened using a PID in accordance with Section 4.7.1.1 of the SAP (IT, 2000a) to measure for volatile organic vapors. The sample displaying the highest reading was selected and sent to the laboratory for analysis; however, at those locations where PID readings were not greater than background, the deepest sample interval above the saturated zone was submitted for analyses. Samples to be analyzed for VOCs were collected directly from the sampler with three EnCore® samplers. The remaining portion of the sample was transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. Samples submitted for laboratory analyses are summarized in Table 3-2. The on-site geologist constructed a detailed boring log for each soil boring. The lithological log for each borehole is included in Appendix B.

At the completion of soil sampling, boreholes were abandoned with bentonite chips and hydrated with potable water following borehole abandonment procedures summarized in Appendix B of the SAP (IT, 2000a).

3.1.3 Well Installation

Six temporary wells were installed in the residuum groundwater zone at the DRMO Area, Parcel 85(7), to collect groundwater samples for laboratory analyses. The well/groundwater sampling locations are shown on Figure 3-1. Table 3-3 summarizes construction details of the wells installed at the site. The well construction logs are included in Appendix B.

Table 3-3

Temporary Well Construction Summary
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Temporary Well	Northing	Easting	Ground Elevation (ft msl)	TOC Elevation (ft msl)	Well Depth (ft bgs)	Screen Length (ft)	Screen Interval (ft bgs)	Well Material
PPMP-85-GP01	1172156.216	672811.424	800.06	801.59	28.0	15	12.60 - 27.60	2" ID Sch 40 PVC
PPMP-85-GP02	1172314.155	672954.774	800.82	801.53	20.0	15	4.50 - 19.50	2" ID Sch 40 PVC
PPMP-85-GP03	1172438.255	672620.485	797.76	798.71	24.5	15	9.25 - 24.25	2" ID Sch 40 PVC
PPMP-85-GP04	1172570.105	672636.195	796.07	798.25	21.5	15	6.20 - 21.20	2" ID Sch 40 PVC
PPMP-85-GP05	1172712.365	672811.044	798.10	800.56	19.0	15	3.80 - 18.80	2" ID Sch 40 PVC
PPMP-85-GP09	1172341.215	672666.645	801.75	804.54	25.0	15	9.50 - 24.50	2" ID Sch 40 PVC

Temporary wells installed using hollow-stem auger drill rig.
Horizontal coordinates referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983 (NAD83).
Elevations referenced to the North American Vertical Datum of 1988 (NAVD88).
2" ID Sch. 40 PVC - 2-inch inside diameter, Schedule 40, polyvinyl chloride.
bgs - Below ground surface.
ft - Feet.
msl - Mean sea level.
TOC - Top of casing.

IT contracted Miller Drilling, Inc., to install the temporary wells with a hollow-stem auger rig at the well/groundwater sample locations shown on Figure 3-1. IT installed the temporary wells at the locations where direct-push soil samples were collected. The wells were installed following procedures outlined in Section 4.7 and Appendix C of the SAP (IT, 2000a). The boreholes at these locations were advanced with a 4.25-inch inside diameter (ID) hollow-stem auger from ground surface to the first water-bearing zone in residuum at the well location. The borehole was augered to the depth of direct-push sampler refusal and samples were collected at the depth of direct-push refusal to the bottom of the borehole. A 2-foot long, 2-inch ID carbon steel split-spoon sampler was driven at 5-foot intervals to collect residuum for observing and describing lithology. Where split-spoon refusal was encountered, the auger was advanced until the first water-bearing zone was encountered. The on-site geologist logging the auger boreholes at the DRMO Area, Parcel 85(7), continued the lithological log for each borehole from the depth of split-spoon refusal to the bottom of the auger borehole by logging the auger drill cuttings. The drill cuttings were logged to determine lithologic changes and the approximate depth of groundwater encountered during drilling. This information was used to determine the optimal placement of the monitoring well screen interval and to provide site-specific geological and hydrogeologic information. The lithological log for each borehole is included in Appendix B.

Upon reaching the target depth, a 15-foot length of 2-inch ID, 0.010-inch factory slotted, Schedule 40 polyvinyl chloride (PVC) screen with a 3-inch PVC end cap was placed through the auger to the bottom of the borehole. The screen and end cap were attached to 2-inch ID, flush-threaded Schedule 40 PVC riser. A filter pack consisting of number 1 filter sand (environmentally safe, clean fine sand, sieve size 20 to 40) was tremied around the well screen to approximately 2 feet above the top of the well screen as the augers were removed. The wells were surged approximately 10 minutes using a solid PVC surge block, or until no more settling of the filter sand occurred inside the borehole. A bentonite seal, consisting of approximately 2 feet of bentonite chips, was placed immediately on top of the filter pack and hydrated with potable water. If the bentonite seal was installed below the water table surface, the bentonite chips were allowed to hydrate in the groundwater. Bentonite seal placement and hydration followed procedures in Appendix C of the SAP (IT, 2000a). A locking well cap was placed on the PVC well casing. The temporary well surface completion included attaching plastic sheeting around the PVC riser using duct tape. Additionally, sandbags were used to secure the sheeting to the ground surface around the temporary well.

The temporary wells were developed by surging and pumping with a submersible pump in accordance with methodology outlined in Section 4.8 and Appendix C of the SAP (IT, 2000a). The submersible

pump being used for well development was moved in an up-and-down fashion to encourage any residual well installation materials to enter the well. These materials were then pumped out of the well in order to re-establish the natural hydraulic flow conditions. Development continued until the water turbidity was equal to or less than 20 nephelometric turbidity units or for a maximum of 4 hours. The well development logs are included in Appendix C of this SI report.

3.1.4 Water Level Measurements

The depth to groundwater was measured in the temporary wells installed at the DRMO Area, Parcel 85(7), and in wells at adjacent parcels in March 2000 following procedures outlined in Section 4.18 of the SAP (IT, 2000a). Depth to groundwater was measured with an electronic water level meter. The meter probe and cable were cleaned between use at each well following decontamination methodology presented in Section 4.10 of the SAP (IT, 2000a). Measurements were referenced to the top of the PVC casing. A summary of groundwater level measurements is presented in Table 3-4.

3.1.5 Groundwater Sampling

Groundwater was sampled from the six temporary wells at the DRMO Area, Parcel 85(7). The well/groundwater sampling locations are shown on Figure 3-1. The groundwater sampling locations and rationale are listed in Table 3-1. The groundwater sample designations and QA/QC samples are listed in Table 3-5.

Sample Collection. Groundwater sampling was performed at six temporary well locations following procedures outlined in Section 4.9.1.4 of the SAP (IT, 2000a). Groundwater was sampled after purging a minimum of three well volumes and after field parameters, including temperature, pH, specific conductivity, oxidation-reduction potential, and turbidity, stabilized. Purging and sampling were performed with a submersible pump equipped with Teflon™ tubing. Field parameters were measured using a calibrated water quality meter. Field parameter readings are summarized in Table 3-6. Sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-5 using methods outlined in Section 3.3.

3.1.6 Surface Water Sampling

Five surface water samples were collected at the DRMO Area, Parcel 85(7), at the locations shown on Figure 3-1. The surface water sampling locations and rationale are listed in Table 3-1. The surface water sample designations and QA/QC samples are listed in Table 3-7. The sampling locations were determined in the field, based on drainage pathways and actual field observations.

Table 3-4

Groundwater Elevations
DRMO Area, Parcel 85(7) and Vicinity
Fort McClellan, Calhoun County, Alabama

Well Location	Date	Depth to Water (ft BTOC)	Ground Elevation (ft msl)	Top of Casing Elevation (ft msl)	Groundwater Elevation (ft msl)
PPMP-85-GP01	13-Mar-00	11.44	800.06	801.59	790.15
PPMP-85-GP02	13-Mar-00	4.10	800.82	801.53	797.43
PPMP-85-GP03	13-Mar-00	12.80	797.76	798.71	785.91
PPMP-85-GP04	13-Mar-00	8.18	796.07	798.25	790.07
PPMP-85-GP05	13-Mar-00	7.03	798.10	800.56	793.53
PPMP-85-GP09	13-Mar-00	19.81	801.75	804.54	784.73
FTP-77-GP01(W)	13-Mar-00	6.20	789.56	789.66	783.46
FTP-77-GP02(W)	13-Mar-00	8.83	787.78	789.79	780.96
FTA-149-GP12	13-Mar-00	6.25	788.04	789.93	783.68
FTA-149-GP13	13-Mar-00	4.71	784.57	782.32	779.86
FTA-131-GP02	13-Mar-00	3.01	791.36	793.21	790.20

Elevations referenced to the North American Vertical Datum of 1988 (NAVD88).

BTOC - Below top of casing.
ft - Feet.
msl - Mean sea level.
W - Groundwater sampling location.

Table 3-5

Groundwater Sample Designations and QA/QC Samples
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	QA/QC Samples			Analytical Suite
		Field Duplicates	Field Splits	MS/MSD	
PPMP-85-GP01	PPMP-85-GP01-GW-KN3001-REG	PPMP-85-GP01-GW-KN3002-FD	PPMP-85-GP01-GW-KN3003-FS		TCL VOCs, TCL SVOCs, TAL Metals, Cl Pesticides/Herbicides, PCBs OP Pesticides
PPMP-85-GP02	PPMP-85-GP02-GW-KN3004-REG				TCL VOCs, TCL SVOCs, TAL Metals, Cl Pesticides/Herbicides, PCBs OP Pesticides
PPMP-85-GP03	PPMP-85-GP03-GW-KN3005-REG				TCL VOCs, TCL SVOCs, TAL Metals, Cl Pesticides/Herbicides, PCBs OP Pesticides
PPMP-85-GP04	PPMP-85-GP04-GW-KN3006-REG				TCL VOCs, TCL SVOCs, TAL Metals, Cl Pesticides/Herbicides, PCBs OP Pesticides
PPMP-85-GP05	PPMP-85-GP05-GW-KN3007-REG				TCL VOCs, TCL SVOCs, TAL Metals, Cl Pesticides/Herbicides, PCBs OP Pesticides
PPMP-85-GP09	PPMP-85-GP09-GW-KN3008-REG				TCL VOCs, TCL SVOCs, TAL Metals, Cl Pesticides/Herbicides, PCBs OP Pesticides

Groundwater samples were collected from the approximate midpoint of the saturated screened interval of the monitoring well.

Cl - Chlorinated.
FD - Field duplicate.
FS - Field split.
MS/MSD - Matrix spike/matrix spike duplicate.
OP - Organophosphorus.
PCB - Polychlorinated biphenyl.
QA/QC - Quality assurance/quality control.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.

Table 3-6

Groundwater and Surface Water Field Parameters
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Date	Media	Specific Conductivity (mS/cm)[a]	Dissolved Oxygen (mg/L)	ORP (mV)	Temperature (^{o}C)	Turbidity (NTUs)	pH (SU)
PPMP-85-GP01	24-Mar-99	GW	0.918	0.20	42	18.96	93.0	6.81
PPMP-85-GP02	24-Mar-99	GW	1.405	0.25	89	17.45	0.0	6.74
PPMP-85-GP03	24-Mar-99	GW	2.510	1.26	67	20.99	1.7	6.57
PPMP-85-GP04	24-Mar-99	GW	1.138	0.08	56	20.36	10.6	6.81
PPMP-85-GP05	25-Mar-99	GW	0.720	0.11	-91	17.98	51.6	6.85
PPMP-85-GP09	25-Mar-99	GW	1.836	0.36	98	19.39	13.8	6.69
PPMP-85-SW/SD01	26-Jan-99	SW	0.102	2.93	NR	9.22	3.7	5.52
PPMP-85-SW/SD02	26-Jan-99	SW	0.102	2.93	NR	9.22	3.7	5.52
PPMP-85-SW/SD03	26-Jan-99	SW	0.194	7.19	NR	13.50	3.7	6.25
PPMP-85-SW/SD04	26-Jan-99	SW	0.367	6.59	NR	11.63	0.7	6.90
PPMP-85-SW/SD05	25-Jan-99	SW	0.224	11.16	NR	14.54	71.1	7.69

[a] Specific conductivity values standardized to millisiemens per centimeter.

^{o}C - Degrees Celsius.
GW - Groundwater.
mg/L - Milligram per liter.
mS/cm - Millisiemen per centimeter.
mV - Millivolts.
NR - Not recorded.
NTUs - Nephelometric turbidity units.
ORP - Oxidation-reduction potential.
SU - Standard units.
SW - Surface water.

Table 3-7

Surface Water and Sediment Sample Designations and QA/QC Samples
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft. bgs)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
PPMP-85-SW/SD01	PPMP-85-SW/SD01-SW-KN2001-REG	NA				TCL VOCs, TCL SVOCs, TAL Metals, Cl Pesticides, PCBs, Cl Herbicides, OP Pesticides, and TOC and Grain Size (Sediment only)
	PPMP-85-SW/SD01-SD-KN1001-REG	0-0.5	PPMP-85-SW/SD01-SD-KN1002-FD	PPMP-85-SW/SD01-SD-KN1003-FS		
PPMP-85-SW/SD02	PPMP-85-SW/SD02-SW-KN2002-REG	NA			PPMP-85-SW/SD02-SW-KN2002-MS PPMP-85-SW/SD02-SW-KN2002-MSD	TCL VOCs, TCL SVOCs, TAL Metals, Cl Pesticides, PCBs, Cl Herbicides, OP Pesticides, and TOC and Grain Size (Sediment only)
	PPMP-85-SW/SD02-SD-KN1004-REG	0-0.5				
PPMP-85-SW/SD03	PPMP-85-SW/SD03-SW-KN2003-REG	NA				TCL VOCs, TCL SVOCs, TAL Metals, Cl Pesticides, PCBs, Cl Herbicides, OP Pesticides, and TOC and Grain Size (Sediment only)
	PPMP-85-SW/SD03-SD-KN1005-REG	0-0.5				
PPMP-85-SW/SD04	PPMP-85-SW/SD04-SW-KN2004-REG	NA				TCL VOCs, TCL SVOCs, TAL Metals, Cl Pesticides, PCBs, Cl Herbicides, OP Pesticides, and TOC and Grain Size (Sediment only)
	PPMP-85-SW/SD04-SD-KN1006-REG	0-0.5				
PPMP-85-SW/SD05	PPMP-85-SW/SD05-SW-KN2005-REG	NA				TCL VOCs, TCL SVOCs, TAL Metals, Cl Pesticides, PCBs Cl Herbicides, OP Pesticides, and TOC and Grain Size (Sediment only)
	PPMP-85-SW/SD05-SD-KN1007-REG	0-0.5				

Cl - Chlorinated.
FD - Field duplicate.
FS - Field split.
ft. bgs - Feet below ground surface.
MS/MSD - Matrix spike/matrix spike duplicate.
NA - Not applicable.
OP - Organophosphorus.
PCB - Polychlorinated biphenyl.
QA/QC - Quality assurance/quality control.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
TOC - Total organic carbon.
VOC - Volatile organic compound.

Sample Collection. Surface water samples were collected in accordance with the procedures specified in Section 4.9.1.3 of the SAP (IT, 2000a). The surface water samples were collected by dipping a clean stainless-steel pitcher in the water and pouring the water in the appropriate sample containers. Surface water samples were collected after the field parameters described in Section 3.1.5 had been measured using a calibrated water quality meter. The field parameter readings are presented in Table 3-6. Sample collection logs are included in Appendix A. The samples were analyzed for the parameters listed in Table 3-7 using methods outlined in Section 3.3.

3.1.7 Sediment Sampling

Five sediment samples were collected at the same locations as the surface water samples discussed in Section 3.1.6. The sediment sampling locations are shown on Figure 3-1. Sediment sampling locations and rationale are presented in Table 3-1. The sediment sample designations and QA/QC samples are listed in Table 3-7. The sediment sampling locations were determined in the field, based on drainage pathways and actual field observations.

Sample Collection. Sediment samples were collected in accordance with the procedures specified in Section 4.9.1.2 of the SAP (IT, 2000a). The sediment samples were collected with a clean stainless-steel spoon and placed in a stainless-steel bowl. Samples for VOC analyses were then immediately collected from the bowl with three EnCore® samplers. The remaining portion of the sample was homogenized and placed in the appropriate sample containers. Sample collection logs are included in Appendix A. The sediment samples were analyzed for the parameters listed in Table 3-7 using methods outlined in Section 3.3.

3.2 Surveying of Sample Locations

Sample locations were surveyed using global positioning system survey techniques described in Section 4.3 of the SAP (IT, 2000a), and conventional civil survey techniques described in Section 4.19 of the SAP (IT, 2000a). Horizontal coordinates were referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983. Elevations were referenced to the North American Vertical Datum of 1988. Horizontal coordinates and elevations are included in Appendix D.

3.3 Analytical Program

Samples collected during the SI were analyzed for various physical and chemical parameters. The specific suite of analyses performed was based on the potential site-specific chemicals historically at the

site and EPA, ADEM, FTMC, and USACE requirements. Samples collected at the DRMO Area, Parcel 85(7), were analyzed for the following parameters:

- Target compound list VOCs - EPA Method 5035/8260B
- Target compound list SVOCs - EPA Method 8270C
- Target analyte list metals - EPA Method 6010B/7000
- PCBs - EPA Method 8082
- Chlorinated pesticides - EPA Method 8081A
- Chlorinated herbicides - EPA Method 8051A
- Organophosphorous pesticides - EPA Method 8141A
- Total organic carbon (TOC) - EPA Method 9060 (sediment only)
- Grain size - American Society for Testing and Materials D421/D422 (sediment only).

The samples were analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 6-1 in Appendix B of the SAP (IT, 2000a). Data were reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of Appendix B of the SAP). Chemical data were reported via hard copy data packages by the laboratory using Contract Laboratory Program-like forms. These packages were validated in accordance with EPA National Functional Guidelines by Level III criteria. A summary of validated data is included in Appendix E. The Data Validation Summary Report is included as Appendix F.

3.4 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping followed requirements specified in Section 4.13.2 of the SAP (IT, 2000a). Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SI are listed in Chapter 5.0, Table 5-1, of Appendix B of the SAP. Sample documentation and chain-of-custodies were recorded as specified in Section 4.13 of the SAP.

Completed analysis request and chain-of-custody records (Appendix A) were secured and included with each shipment of sample coolers to Quanterra Environmental Services in Knoxville, Tennessee. Split samples were shipped to USACE South Atlantic Division Laboratory in Marietta, Georgia.

3.5 Investigation-Derived Waste Management and Disposal

Investigation-derived waste (IDW) was managed and disposed as outlined in Appendix D of the SAP (IT, 2000a). The IDW generated during the SI at DRMO Area, Parcel 85(7), was segregated as follows:

- Drill cuttings
- Purge water from well development/sampling activities and decontamination fluids
- Personal protective equipment.

Solid IDW was stored inside the fenced area surrounding Buildings 335 and 336 in lined roll-off bins prior to characterization and final disposal. Solid IDW was characterized using toxicity characteristic leaching procedure analyses. Based on the results, drill cuttings and personal protective equipment generated during the SI at the DRMO Area, Parcel 85(7), were disposed as nonregulated waste at the Industrial Waste Landfill on the Main Post of FTMC.

Liquid IDW was contained in the existing 20,000-gallon sump associated with the Building T-338 vehicle washrack. Liquid IDW was characterized by VOC, SVOC, and metals analyses. Based on the analyses, liquid IDW was discharged as nonregulated waste to the FTMC wastewater treatment plant on the Main Post.

3.6 Variances/Nonconformances

3.6.1 Variances

Three variances to the SFSP were recorded during completion of the SI at the DRMO Area, Parcel 85(7). The variances did not alter the intent of the investigation or the sampling rationale presented in Table 4-2 of the SFSP (IT, 1998a). The variances to the SFSP are summarized in Table 3-8 and included in Appendix G.

3.6.2 Nonconformances

There were not any nonconformances to the SFSP recorded during completion of the SI at the DRMO Area, Parcel 85(7).

3.7 Data Quality

The field sample analytical data are presented in tabular form in Appendix E. The field samples were collected, documented, handled, analyzed, and reported in a manner consistent with the SI work plan; the FTMC SAP and quality assurance plan; and standard, accepted methods and procedures. Sample collection logs pertaining to the collection of these samples were reviewed and organized for this report and are included in Appendix A. As discussed in Section 3.6, there were three variances to the SFSP. However, the variances did not impact the usability of the data.

Table 3-8

Variances to the Site-Specific Field Sampling Plan
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Variance to the SFSP	Justification for Variance	Impact to Site Investigation
Surface water and sediment sample location PPMP-85-SW/SD01 was relocated approximately 75 feet south of the proposed location, and surface water and sediment sample location PPMP-85-SW/SD02 was relocated approximately 100 feet south of the proposed location.	Surface water and sediment were not present at the proposed locations.	Relocation of the surface water and sediment sample points allowed successful sample collection for analysis.
Surface water and sediment sample location PPMP-85-SW/SD04 was relocated approximately 475 feet southeast of its proposed location.	Proposed surface water and sediment sample PPMP-85-SW/SD04 was located in a concrete drain which is inappropriate for surface water and sediment sample collection.	Relocation of the surface water and sediment sample 475 feet southeast to the opposite side of the parcel allowed successful collection of the sample for analysis.
Surface water and sediment sample location PPMP-85-SW/SD05 was relocated approximately 200 feet southwest of its proposed location.	Surface water and sediment were not present at the proposed location.	Relocation of the surface water and sediment sample point allowed successful sample collection for analysis.

Data Validation. A complete (100 percent) Level III data validation effort was performed on the reported analytical data. Appendix F consists of a data validation summary report that was prepared to discuss the validation results. Selected results were rejected or otherwise qualified based on the implementation of accepted data validation procedures and practices. These qualified parameters are highlighted in the report. The validation-assigned qualifiers were added to the FTMC IT Environmental Management System™ database for tracking and reporting. The qualified data were used in the comparison to the SSSLs and ESVs. Rejected data (assigned an "R" qualifier) were not used in the comparison to the SSSLs and ESVs.

The data presented in this report, except where qualified, meet the principle data quality objective for this SI.

4.0 Site Characterization

Subsurface investigations performed at the DRMO Area, Parcel 85(7), provided soil, geologic, and groundwater data used to characterize the geology and hydrogeology of the site.

4.1 Regional and Site Geology

4.1.1 Regional Geology

Calhoun County includes parts of two physiographic provinces, the Piedmont Upland Province and the Valley and Ridge Province. The Piedmont Upland Province occupies the extreme eastern and southeastern portions of the county and is characterized by metamorphosed sedimentary rocks. The generally accepted range in age of these metamorphics is Cambrian to Devonian.

The majority of Calhoun County, including the Main Post of FTMC, lies within the Appalachian fold and thrust structural belt (Valley and Ridge Province) where southeastward-dipping thrust faults with associated minor folding are the predominant structural features. The fold and thrust belt consists of Paleozoic sedimentary rocks that have been asymmetrically folded and thrust-faulted with major structures and faults striking in a northeast-southwest direction.

Northwestward transport of the Paleozoic rock sequence along the thrust faults has resulted in the imbricate stacking of large slabs of rock referred to as thrust sheets. Within an individual thrust sheet, smaller faults may splay off the larger thrust fault, resulting in imbricate stacking of rock units within an individual thrust sheet (Osborne and Szabo, 1984). Geologic contacts in this region generally strike parallel to the faults and repetition of lithologic units is common in vertical sequences. Geologic formations within the Valley and Ridge Province portion of Calhoun County have been mapped by Warman and Causey (1962), Osborne and Szabo (1984), and Moser and DeJarnette (1992), and vary in age from Lower Cambrian to Pennsylvanian.

The basal unit of the sedimentary sequence in Calhoun County is the Cambrian Chilhowee Group. The Chilhowee Group is comprised of the Cochran, Nichols, Wilson Ridge, and Weisner Formations (Osborne and Szabo, 1984), but in Calhoun County is either undifferentiated or divided into the Cochran and Nichols Formations and an upper undifferentiated Wilson Ridge and Weisner Formation. The Cochran is composed of poorly sorted arkosic sandstone and conglomerate with interbeds of greenish-gray siltstone and mudstone. Massive to laminated, greenish-gray and black mudstone makes

up the Nichols Formation with thin interbeds of siltstone and very fine-grained sandstone (Szabo et al., 1988). These two formations are mapped only in the eastern part of the county.

The Wilson Ridge and Weisner Formations are undifferentiated in Calhoun County and consist of both coarse-grained and fine-grained clastics. The coarse-grained facies appear to dominate the unit and consist primarily of coarse-grained, vitreous quartzite, and friable, fine- to coarse-grained, orthoquartzitic sandstone, both of which locally contain conglomerate. The fine-grained facies consists of sandy and micaceous shale and silty, micaceous mudstone which are locally interbedded with the coarse clastic rocks. The abundance of orthoquartzitic sandstone and quartzite suggests that most of the Chilhowee Group bedrock in the vicinity of FTMC belongs to the Weisner Formation (Osborne and Szabo, 1984).

The Cambrian Shady Dolomite overlies the Weisner Formation northeast, east, and southwest of the Main Post, and consists of interlayered bluish-gray or pale yellowish-gray sandy dolomitic limestone and siliceous dolomite with coarsely crystalline porous chert (Osborne et al., 1989). A variegated shale and clayey silt have been included within the lower part of the Shady Dolomite (Cloud, 1966). Material similar to this lower shale unit was noted in core holes drilled by the Alabama Geologic Survey on FTMC (Osborne and Szabo, 1984). The character of the Shady Dolomite in the FTMC vicinity and the true assignment of the shale at this stratigraphic interval are still uncertain (Osborne, 1999).

The Rome Formation overlies the Shady Dolomite and locally occurs to the northwest and southeast of the Main Post as mapped by Warman and Causey (1962) and Osborne and Szabo (1984), and immediately to the west of Reilly Airfield (Osborne and Szabo, 1984). The Rome Formation consists of variegated thinly interbedded grayish-red-purple mudstone, shale, siltstone, and greenish-red and light gray sandstone, with locally occurring limestone and dolomite. The Conasauga Formation overlies the Rome Formation and occurs along anticlinal axes in the northeastern portion of Pelham Range (Warman and Causey, 1962), (Osborne and Szabo, 1984) and the northern portion of the Main Post (Osborne et al., 1997). The Conasauga Formation is composed of dark-gray, finely to coarsely crystalline medium- to thick-bedded dolomite with minor shale and chert (Osborne et al., 1989).

Overlying the Conasauga Formation is the Knox Group, which is composed of the Copper Ridge and Chepultepec dolomites of Cambro-Ordovician age. The Knox Group is undifferentiated in Calhoun County and consists of light medium gray, fine to medium crystalline, variably bedded to laminated,

siliceous dolomite and dolomitic limestone that weathers to a chert residuum (Osborne and Szabo, 1984). The Knox Group underlies a large portion of the Pelham Range area.

The Ordovician Newala and Little Oak Limestones overlie the Knox Group. The Newala Limestone consists of light to dark gray, micritic, thick-bedded limestone with minor dolomite. The Little Oak Limestone is comprised of dark gray, medium- to thick-bedded, fossiliferous, argillaceous to silty limestone with chert nodules. These limestone units are mapped together as undifferentiated at FTMC and other parts of Calhoun County. The Athens Shale overlies the Ordovician limestone units. The Athens Shale consists of dark-gray to black shale and graptolitic shale with localized interbedded dark gray limestone (Osborne et al., 1989). These units occur within an eroded "window" in the uppermost structural thrust sheet at FTMC and underlie much of the developed area of the Main Post.

Other Ordovician-aged bedrock units mapped in Calhoun County include the Greensport Formation, Colvin Mountain Sandstone, and Sequatchie Formation. These units consist of various siltstones, sandstones, shales, dolomites and limestones, and are mapped as one, undifferentiated unit in some areas of Calhoun County. The only Silurian-age sedimentary formation mapped in Calhoun County is the Red Mountain Formation. This unit consists of interbedded red sandstone, siltstone, and shale with greenish-gray to red silty and sandy limestone.

The Devonian Frog Mountain Sandstone consists of sandstone and quartzitic sandstone with shale interbeds, dolomudstone, and glauconitic limestone (Szabo et al., 1988). This unit locally occurs in the western portion of Pelham Range.

The Mississippian Fort Payne Chert and the Maury Formation overlie the Frog Mountain Sandstone and are composed of dark- to light-gray limestone with abundant chert nodules and greenish-gray to grayish-red phosphatic shale with increasing amounts of calcareous chert toward the upper portion of the formation (Osborne and Szabo, 1984). These units occur in the northwestern portion of Pelham Range. Overlying the Fort Payne Chert is the Floyd Shale, also of Mississippian age, which consists of thin-bedded, fissile brown to black shale with thin intercalated limestone layers and interbedded sandstone. Osborne and Szabo (1984) reassigned the Floyd Shale, which was mapped by Warman and Causey (1962) on the Main Post of FTMC, to the Ordovician Athens Shale on the basis of fossil data.

The Jacksonville Thrust Fault is the most significant structural geologic feature in the vicinity of FTMC, both for its role in determining the stratigraphic relationships in the area and for its contribution to regional water supplies. The trace of the fault extends northeastward for approximately 39 miles between Bynum, Alabama and Piedmont, Alabama. The fault is interpreted as a major splay of the Pell City Fault (Osborne and Szabo, 1984). The Ordovician sequence comprising the Eden thrust sheet is exposed at FTMC through an eroded "window" or "fenster" in the overlying thrust sheet. Rocks within the window display complex folding with the folds being overturned, and tight to isoclinal. The carbonates and shales locally exhibit well-developed cleavage (Osborne and Szabo, 1984). The FTMC window is framed on the northwest by the Rome Formation, north by the Conasauga Formation, northeast, east, and southwest by the Shady Dolomite, and southeast and southwest by the Chilhowee Group (Osborne et al., 1997).

4.1.2 Site Geology

Soils at the DRMO Area, Parcel 85(7), fall into the Rarden silty clay loams (ReB3). This mapping unit consists of severely eroded soils that have a 2 to 6 percent slope. These soils generally occur on wide shale ridges having slopes of 2 to 10 percent, and have developed from the residuum of shale and fine-grained, platy sandstone or limestone. Concretions and fragments of sandstone, up to one-half-inch diameter, are common on the surface and in the soil. The color of the soils ranges from yellowish-red to dark-brown. The texture of subsoil ranges from clay to silty clay. These soils are moderately well-drained, strongly acid to very strongly acid (U.S. Department of Agriculture, 1961).

The DRMO Area, Parcel 85(7), is situated near the eastern boundary of the Ordovician window in the uppermost thrust sheet with the Jacksonville Fault just east of the site (Figure 4-1). Bedrock beneath the site is mapped as Mississippian/Ordovician Floyd and Athens shale undifferentiated. The Cambrian Shady Dolomite underlies the area east of the site (Figure 4-1) and is an area of high relief. Rock fragments present within the residuum at the site may have been derived from this area.

A geologic cross section was constructed using direct-push and hollow-stem auger boring data collected during the SI, as shown on Figure 4-2. The geologic cross section is shown on Figure 3-1. Based on Figure 4-2, residuum beneath the DRMO Area, Parcel 85(7), consists of predominantly sand and clay with gravel fragments. Figure 4-2 also shows that weathered shale was encountered at depths ranging from 4 feet bgs in PPMP-85-GP03 to 10.5 feet bgs in PPMP-85-GP06. Direct-push refusal was encountered at depths ranging from 3 to 11 feet bgs. Competent bedrock was not encountered during drilling.

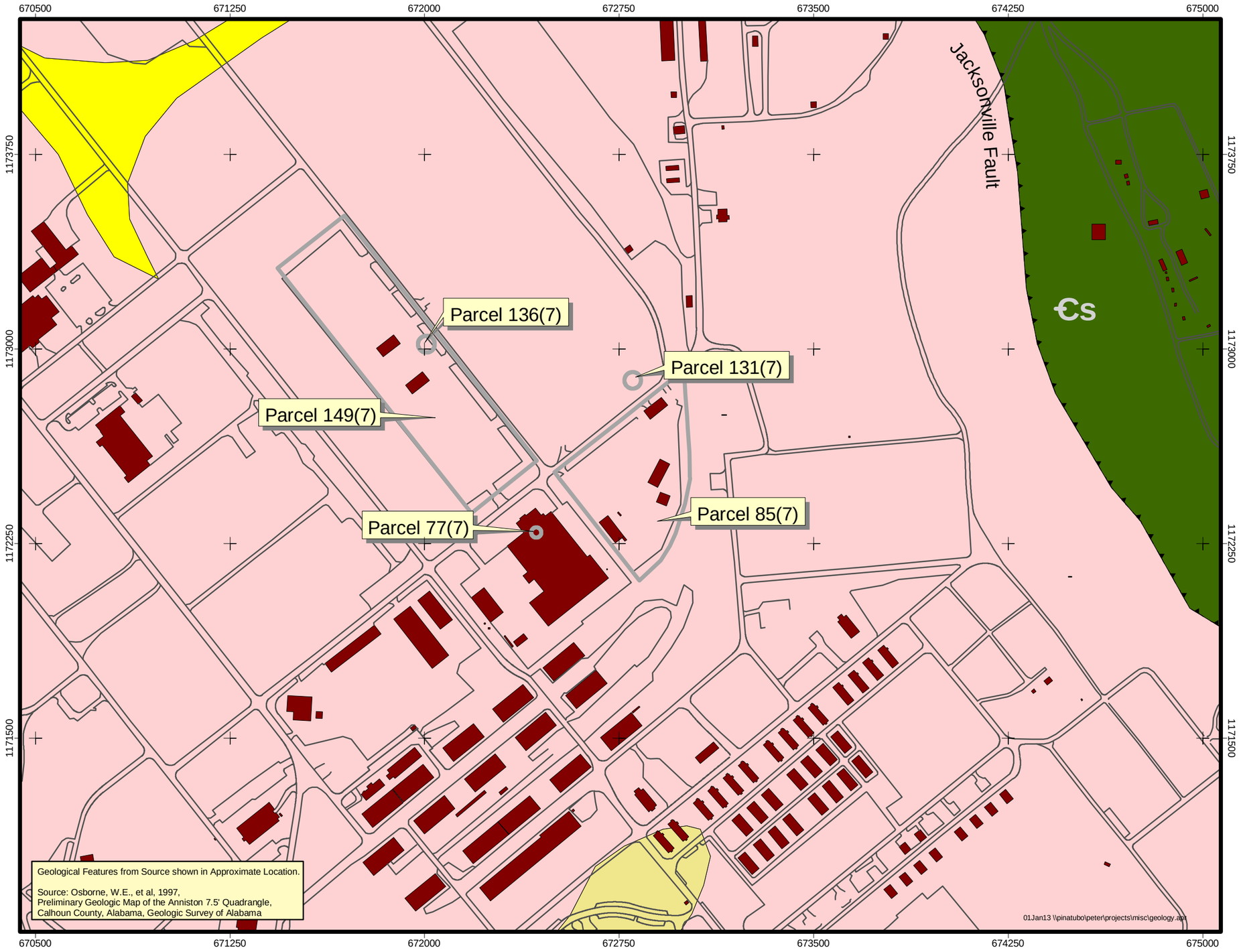


Figure 4-1

Site Geologic Map DRMO Area, Parcel 85(7)

Legend

- CERFA Parcels
- Buildings
- Roads
- Thrust Fault

Geology

- Cs — Cambrian - Shady Dolomite
- MOfa — Mississippian/Ordovician - Floyd & Athens Shale, Undifferentiated
- Oln — Ordovician - Little Oak and Newala Limestones
- Qal — Quaternary - alluvium

0 250 500

Alabama State Plane feet

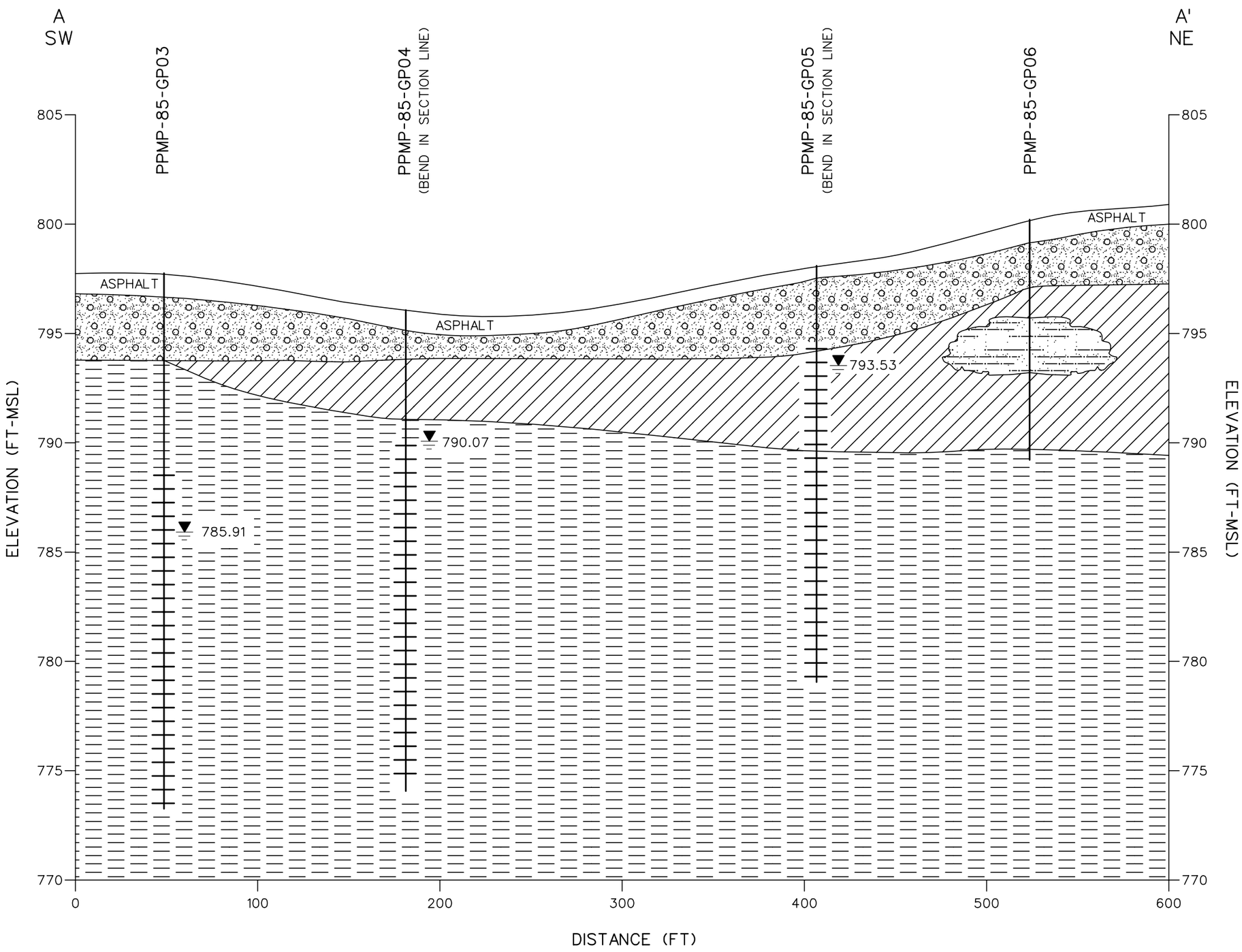
January 2001

Fort McClellan
Environmental Office

N

U.S. Army Corps of Engineers
Mobile District
Fort McClellan
Calhoun County, Alabama
Contract No. DACA21-96-D-0018

IT CORPORATION



LEGEND

- SCREEN INTERVAL
- WATER TABLE (3/13/00)
- 785.91 GROUNDWATER ELEVATION (FT MSL)
- GRAVELLY SAND
- SILTY SAND
- CLAY
- WEATHERED SHALE

NOTES:

1. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.
2. SEE FIGURE 3-1 FOR CROSS SECTION LOCATION.

HORIZONTAL
0 60 120 FEET

FIGURE 4-2
GEOLOGIC CROSS SECTION A-A'
DRMO AREA
PARCEL 85(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
A Member of The IT Group

DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
PROJ. MGR.: J. YACOUB
INITIATOR: D. LAMB
DWG. NO.: ...\774645es.628
REV.:
DATE LAST REV.:
DRAWN BY:
STARTING DATE: 09/29/00
DRAWN BY: D. BILLINGSLEY
PROJ. NO.: 774645
01/31/01
01:11:21
DBILLING
c:\cadd\design\774645es.628

4.2 Site Hydrology

4.2.1 Surface Hydrology

Precipitation in the form of rainfall averages about 54 inches annually in Anniston, Alabama, with infiltration rates annually exceeding evapotranspiration rates. The major surface water features at the Main Post of FTMC include Remount Creek, Cane Creek, and Cave Creek. These waterways flow in a general northwest to westerly direction towards the Coosa River on the western boundary of Calhoun County.

Surface runoff at the DRMO Area, Parcel 85(7), flows into manmade surface drainage pathways on the east, southwest, and northwest portions of the parcel. These drainage pathways follow the general topography and direct the surface water to the southwest toward the tributary of Cave Creek.

4.2.2 Hydrogeology

Static groundwater levels were measured in temporary wells installed at the site and in wells installed in the immediate vicinity on March 13, 2000. Table 3-4 summarizes measured groundwater elevations at the DRMO Area, Parcel 85(7), and vicinity. A groundwater elevation map was constructed from the March 2000 data and is shown on Figure 4-3. Groundwater flow at the site is generally to the west/southwest and follows the site topography. Hydraulic gradients across the site were calculated to be approximately 0.015 feet per foot between PPMP-85-GP05 and PPMP-85-GP04, and 0.044 feet per foot between PPMP-85-GP02 and PPMP-85-GP09.

During boring and well installation activities, groundwater was generally encountered in weathered shale or silt residuum at depths ranging from approximately 7 feet bgs at PPMP-85-GP05 to 22 feet bgs at PPMP-85-GP09. Static groundwater levels summarized in Table 3-4 range from approximately 0.3 feet to 3 feet above the depth to water data from the boring logs for PPMP-85-GP05 and PPMP-85-GP09, respectively (Appendix B). This indicates that the groundwater has an upward hydraulic gradient and is under semiconfined conditions.

DWG. NO.: ...\774645es.629 | PROJ. NO.: 774645
INITIATOR: D. LAMB | PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY: | ENGR. CHCK. BY: S. MORAN
REV.: | DATE LAST REV.:
STARTING DATE: 09/29/00 | DRAWN BY: D. BILLINGSLEY
01/31/01 | 01:32:59 | DRAWN BY:
DBILLNG | c:\cadd\design\774645es.629

N 1,172,800
N 1,172,100
E 672,300
E 673,300
G.W. FLOW
FTA-131-GP02 (790.20)
PARCEL 85(7)
18 TH STREET
2 ND AVENUE
WET WEATHER MARSH AREA
PPMP-85-GP05 (793.53)
PPMP-85-GP04 (790.07)
PPMP-85-GP03 (785.91)
PPMP-85-GP09 (784.73)
PPMP-85-GP02 (797.43)
PPMP-85-GP01 (790.15)
FTA-149-GP12 (783.68)
FTA-149-GP13 (779.86)
FTP-77-GP01(W) (783.46)
FTP-77-GP02(W) (780.96)
780
785
790
795
800
345
T-343
T-344
T-342
341
T-346
348
350

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- FORMER BUILDING LOCATION
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
- (783.46) GROUNDWATER ELEVATION (FT MSL) (MARCH 13, 2000)
- G.W. FLOW GROUNDWATER FLOW DIRECTION
- TREES / TREELINE
- MARSH / WETLANDS
- PARCEL BOUNDARY
- CULVERT WITH HEADWALL
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- RAILROAD
- UTILITY POLE
- GROUNDWATER SAMPLE LOCATION
- GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION

SCALE
0 100 200 FEET

FIGURE 4-3
GROUNDWATER ELEVATION MAP DRMO AREA, PARCEL 85(7)

U. S. ARMY CORPS OF ENGINEERS
MOBILE DISTRICT
FORT McCLELLAN
CALHOUN COUNTY, ALABAMA
Contract No. DACA21-96-D-0018

IT CORPORATION
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5.0 Summary of Analytical Results

The results of the chemical analyses of samples collected at the DRMO Area, Parcel 85(7), indicate that metals, VOCs, SVOCs, chlorinated pesticides, and chlorinated herbicides have been detected in the various site media. PCBs and organophosphorous pesticides were not detected in any of the samples collected. To evaluate whether the detected constituents present an unacceptable risk to human health and the environment, analytical results were compared to the human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluations as part of the ongoing SIs being performed under the BRAC Environmental Restoration Program at FTMC.

Metal concentrations exceeding the SSSLs and ESVs were subsequently compared to metals background screening values (background concentrations) (SAIC, 1998) to determine if the metals concentrations are within natural background concentrations. Summary statistics for background metals samples collected at FTMC (SAIC, 1998) are included in Appendix H. Additionally, SVOC concentrations in surface soils that exceeded the SSSLs and ESVs were compared to PAH background screening values, where available. The PAH background screening values were derived from PAH analytical data from 18 parcels at FTMC that were determined to represent anthropogenic activity (IT, 2000b). PAH background screening values were developed for 2 categories of surface soils: beneath asphalt and adjacent to asphalt. The PAH background screening values for soils adjacent to asphalt are the more conservative (i.e., lower) of the PAH background values and are the values used herein for comparison.

Six compounds were quantified by both SW-846 Method 8260B (as VOC) and Method 8270C (as SVOC), including 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, 1,3-dichlorobenzene, 1,2-dichlorobenzene, hexachlorobutadiene, and naphthalene. Method 8260B yields a reporting limit (RL) of 0.005 milligrams per kilogram (mg/kg), while Method 8270C has an RL of 0.330 mg/kg, which is typical for a soil matrix sample. Because of the direct nature of the Method 8260B analysis and its resulting lower RL, this method should be considered superior to Method 8270C when quantifying low levels (0.005 to 0.330 mg/kg) of these compounds. Method 8270C and its associated methylene chloride extraction step is superior, however, when dealing with samples that contain higher concentrations (greater than 0.330 mg/kg) of these compounds. Therefore, all data were considered, and none were categorically excluded. Data validation qualifiers were helpful in evaluating the usability

of data, especially if calibration, blank contamination, precision, or accuracy indicator anomalies were encountered. The validation qualifiers and concentrations reported (e.g., whether concentrations were less than or greater than 0.330 mg/kg) were used to determine which analytical method was likely to return the more accurate result.

The following sections and Tables 5-1 through 5-5 summarize the results of the comparison of detected constituents to the SSSLs, ESVs, and background screening values. Complete analytical results are presented in Appendix E.

5.1 Surface Soil Analytical Results

Nine surface soil samples were collected for chemical analyses at the DRMO Area, Parcel 85(7). Surface soil samples were collected from the upper 2 feet of soil at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs, ESVs, and background screening values (metals and PAHs), as presented in Table 5-1.

Metals. Twenty-two metals were detected in surface soil samples collected at the DRMO Area, Parcel 85(7). Sample location PPMP-85-GP02 contained twenty-one of the twenty-two detected metals and three other locations (PPMP-85-GP01, PPMP-85-GP03, and PPMP-85-GP09) each contained twenty of the twenty-two detected metals. Four of the sodium results, two of the beryllium and mercury results, and one of the zinc results were flagged with a 'B' data qualifier, signifying that these metals were also detected in an associated laboratory or field blank sample.

The concentrations of aluminum (four locations), arsenic (nine locations), chromium (three locations), and iron (nine locations) exceeded residential human health SSSLs. However, the concentrations of these metals were below their respective background concentration or within the range of background values determined by SAIC (1998) (Appendix H).

The following metals were detected at concentrations exceeding ESVs and their respective background concentration: aluminum (one location), barium (two locations), beryllium (three locations), cadmium (one location), chromium (three locations), cobalt (one location), copper (four locations), iron (two locations), lead (two locations), nickel (three locations), selenium (three locations), silver (three locations), and zinc (four locations). With the exceptions of barium (one location), beryllium (three locations), cadmium (one location), chromium (two locations), copper (four locations), lead (two

Table 5-1

Surface Soil Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-85-GP01					PPMP-85-GP02					PPMP-85-GP03				
Parcel					PPMP-85					PPMP-85					PPMP-85				
Sample Number					KN0001					KN0005					KN0007				
Sample Date					18-Jan-99					15-Jan-99					15-Jan-99				
Sample Depth (Feet)					1-2					0.5-1.5					1-2				
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	9.83E+03			YES	YES	1.07E+04			YES	YES	1.51E+04			YES	YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	4.90E+00			YES		7.10E+00			YES		5.70E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	2.06E+01	J				2.30E+02		YES		YES	7.29E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	1.80E-01	B				1.80E+00		YES		YES	1.20E+00		YES		YES
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					2.90E+00		YES		YES	ND				
Calcium	mg/kg	1.72E+03	NA	NA	1.79E+03	J	YES			1.26E+04	J	YES			1.16E+04	J	YES		
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.40E+01				YES	5.57E+01	J	YES	YES	YES	5.34E+01	J	YES	YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	7.00E+00					2.05E+01	J	YES		YES	ND				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	6.50E+00					8.08E+01	J	YES		YES	3.67E+01	J	YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.68E+04			YES	YES	3.27E+04	J		YES	YES	3.59E+04	J	YES	YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	8.40E+00					1.48E+02	J	YES		YES	4.30E+01	J	YES		
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	8.74E+02	J				8.05E+03	J	YES			8.09E+03	J	YES		
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	2.60E+02				YES	2.96E+02				YES	1.79E+02				YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	6.10E-02					4.00E-02					3.10E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	3.00E+00	J				6.11E+01	J	YES		YES	4.27E+01	J	YES		YES
Potassium	mg/kg	8.00E+02	NA	NA	1.80E+02	J				4.78E+02	J				5.99E+02				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	7.40E-01		YES			1.40E+00		YES		YES	1.80E+00		YES		YES
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	1.40E+00		YES			4.40E+00	J	YES		YES	2.10E+00	J	YES		YES
Sodium	mg/kg	6.34E+02	NA	NA	1.33E+01	B				5.98E+01	J				5.89E+01	J			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					4.40E-01	J			
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	1.79E+01				YES	6.90E+00				YES	9.40E+00				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	9.30E+00	B				3.79E+02		YES		YES	1.46E+02		YES		YES
VOLATILE ORGANIC COMPOUNDS																			
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	1.00E-01	ND					ND					ND				
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	ND					ND					8.00E-03	J			
Acetone	mg/kg	NA	7.76E+02	2.50E+00	6.30E-03	B				2.10E-01	J				3.60E-02	J			
Bromomethane	mg/kg	NA	1.09E+01	NA	1.60E-03	B				1.70E-03	B				2.40E-03	B			
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	3.40E-03	B				2.90E-03	B				2.90E-03	B			
Naphthalene	mg/kg	NA	1.55E+02	1.00E-01	2.70E-03	J				ND					ND				
Toluene	mg/kg	NA	1.55E+03	5.00E-02	ND					ND					ND				
n-Butylbenzene	mg/kg	NA	7.77E+01	NA	ND					ND					ND				

Table 5-1

Surface Soil Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-85-GP01					PPMP-85-GP02					PPMP-85-GP03				
Parcel					PPMP-85					PPMP-85					PPMP-85				
Sample Number					KN0001					KN0005					KN0007				
Sample Date					18-Jan-99					15-Jan-99					15-Jan-99				
Sample Depth (Feet)					1-2					0.5-1.5					1-2				
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
SEMIVOLATILE ORGANIC COMPOUNDS																			
2-Methylnaphthalene	mg/kg	NA	1.55E+02	NA	ND					ND					ND				
Acenaphthene	mg/kg	7.02E-01	4.63E+02	2.00E+01	ND					ND					ND				
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	ND					8.60E-02	J				8.20E-02	J			
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	ND					9.90E-02	J				7.60E-02	J			
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	ND					1.80E-01	J				9.20E-02	J			
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	ND					1.70E-01	J		YES	YES	1.60E-01	J		YES	YES
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	ND					2.10E-01	J				1.30E-01	J			
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	ND					7.60E-02	J				1.20E-01	J			
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	ND					2.00E-01	J				1.40E-01	J			
Carbazole	mg/kg	NA	3.11E+01	NA	ND					ND					ND				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	ND					2.00E-01	J				1.20E-01	J			
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	ND					6.40E-02	B				5.40E-02	B			
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	ND					ND					6.40E-02	J			
Dibenzofuran	mg/kg	NA	3.09E+01	NA	ND					ND					ND				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	ND					1.70E-01	J			YES	9.00E-02	J			
Fluorene	mg/kg	6.67E-01	3.09E+02	1.22E+02	ND					ND					ND				
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	ND					7.00E-02	J				1.10E-01	J			
Naphthalene	mg/kg	3.30E-02	1.55E+02	1.00E-01	ND					ND					ND				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	ND					4.30E-02	J				3.70E-02	J			
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	ND					1.70E-01	J			YES	1.20E-01	J			YES
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					1.00E-01	B				8.10E-02	B			
PESTICIDES																			
4,4'-DDD	mg/kg	NA	2.54E+00	2.50E-03	ND					7.90E-03	J			YES	ND				
4,4'-DDE	mg/kg	NA	1.79E+00	2.50E-03	ND					5.50E-03	J			YES	ND				
Endosulfan sulfate	mg/kg	NA	4.66E+01	3.58E-02	ND					ND					ND				
Heptachlor	mg/kg	NA	1.40E-01	1.00E-01	8.90E-04	J				ND					ND				
HERBICIDES																			
2,2-Dichloropropanoic Acid	mg/kg	NA	2.33E+02	1.00E-01	ND					ND					ND				

Table 5-1

Surface Soil Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-85-GP04					PPMP-85-GP05					PPMP-85-GP06				
Parcel					PPMP-85					PPMP-85					PPMP-85				
Sample Number					KN0009					KN0011					KN0013				
Sample Date					15-Jan-99					15-Jan-99					1-Feb-99				
Sample Depth (Feet)					1-2					1-2					1-2				
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	3.04E+03				YES	2.18E+03				YES	5.62E+03				YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	1.50E+00			YES		2.20E+00			YES		3.60E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	3.69E+01					3.38E+01					1.37E+02		YES		
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	3.80E-01	J				2.20E-01	B				8.80E-01		YES		
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					ND				
Calcium	mg/kg	1.72E+03	NA	NA	2.09E+04	J	YES			2.38E+04	J	YES			8.27E+04		YES		
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	4.59E+01	J	YES	YES	YES	1.10E+01	J			YES	1.22E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	ND					ND					1.37E+01				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	2.13E+02	J	YES		YES	1.03E+01	J				1.65E+02		YES		YES
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	5.15E+03	J		YES	YES	7.23E+03	J		YES	YES	1.24E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	3.74E+02	J	YES		YES	2.63E+01	J				1.64E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	9.39E+03	J	YES			1.16E+04	J	YES			1.64E+04		YES		
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	9.88E+01					5.88E+01					2.64E+02				YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	1.80E-02	J				1.20E-02	J				2.90E-02	J			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	1.95E+01	J	YES			5.10E+00	J				2.43E+01		YES		
Potassium	mg/kg	8.00E+02	NA	NA	3.31E+02	J				1.90E+02	J				3.74E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	ND					ND					5.20E-01	J	YES		
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					ND					ND				
Sodium	mg/kg	6.34E+02	NA	NA	5.93E+01	J				3.48E+01	J				1.31E+02	B			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					ND				
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	1.05E+01				YES	1.12E+01				YES	1.44E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	4.49E+01		YES			4.46E+01		YES			8.48E+01		YES		YES
VOLATILE ORGANIC COMPOUNDS																			
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	1.00E-01	1.30E-02					ND					ND				
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	4.60E-03	J				ND					ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	3.10E-02	J				1.90E-01	J				7.70E-03	B			
Bromomethane	mg/kg	NA	1.09E+01	NA	2.00E-03	B				1.60E-03	B				ND				
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	3.20E-03	B				2.80E-03	B				3.00E-03	B			
Naphthalene	mg/kg	NA	1.55E+02	1.00E-01	7.00E-02	J				ND					ND				
Toluene	mg/kg	NA	1.55E+03	5.00E-02	6.30E-03					9.00E-03					ND				
n-Butylbenzene	mg/kg	NA	7.77E+01	NA	7.80E-03					ND					ND				

Table 5-1

Surface Soil Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-85-GP04					PPMP-85-GP05					PPMP-85-GP06				
Parcel					PPMP-85					PPMP-85					PPMP-85				
Sample Number					KN0009					KN0011					KN0013				
Sample Date					15-Jan-99					15-Jan-99					1-Feb-99				
Sample Depth (Feet)					1-2					1-2					1-2				
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
SEMIVOLATILE ORGANIC COMPOUNDS																			
2-Methylnaphthalene	mg/kg	NA	1.55E+02	NA	2.50E+00					ND					ND				
Acenaphthene	mg/kg	7.02E-01	4.63E+02	2.00E+01	2.60E-01	J				ND					ND				
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	1.00E-01	J				ND					ND				
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	2.10E-01	J			YES	4.20E-02	J				ND				
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	2.10E-01	J				1.10E-01	J				ND				
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	1.60E-01	J		YES	YES	1.10E-01	J		YES	YES	ND				
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	1.40E-01	J				1.00E-01	J				ND				
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	9.50E-02	J				5.70E-02	J				ND				
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	2.00E-01	J				1.10E-01	J				ND				
Carbazole	mg/kg	NA	3.11E+01	NA	ND					ND					ND				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	2.20E-01	J				1.30E-01	J				ND				
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	9.10E-02	B				5.60E-02	B				ND				
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	4.70E-02	J				ND					ND				
Dibenzofuran	mg/kg	NA	3.09E+01	NA	4.60E-01					ND					ND				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	4.70E-01				YES	2.00E-01	J			YES	8.10E-02	J			
Fluorene	mg/kg	6.67E-01	3.09E+02	1.22E+02	7.00E-01		YES			ND					ND				
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	1.10E-01	J				5.10E-02	J				ND				
Naphthalene	mg/kg	3.30E-02	1.55E+02	1.00E-01	2.40E-01	J	YES		YES	ND					ND				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	1.80E+00		YES		YES	1.40E-01	J			YES	ND				
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	5.80E-01				YES	2.10E-01	J			YES	6.20E-02	J			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	7.70E-02	B				8.40E-02	B				ND				
PESTICIDES																			
4,4'-DDD	mg/kg	NA	2.54E+00	2.50E-03	ND					ND					ND				
4,4'-DDE	mg/kg	NA	1.79E+00	2.50E-03	ND					2.70E-03	J			YES	1.50E-02	J			YES
Endosulfan sulfate	mg/kg	NA	4.66E+01	3.58E-02	ND					5.50E-04	J				ND				
Heptachlor	mg/kg	NA	1.40E-01	1.00E-01	ND					ND					ND				
HERBICIDES																			
2,2-Dichloropropanoic Acid	mg/kg	NA	2.33E+02	1.00E-01	1.00E-01				YES	ND					ND				

Table 5-1

Surface Soil Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-85-GP07					PPMP-85-GP08					PPMP-85-GP09				
Parcel					PPMP-85					PPMP-85					PPMP-85				
Sample Number					KN0015					KN0017					KN0019				
Sample Date					1-Feb-99					1-Feb-99					15-Jan-99				
Sample Depth (Feet)					1-2					1-2					0.5-1.5				
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	3.56E+03				YES	2.81E+03				YES	1.80E+04		YES	YES	YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	2.50E+00			YES		1.50E+00			YES		4.10E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	3.82E+01					3.84E+01					3.33E+02		YES		YES
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	4.50E-01	J				3.70E-01	J				2.20E+00		YES		YES
Cadmium	mg/kg	2.90E-01	6.25E+00	1.60E+00	ND					ND					ND				
Calcium	mg/kg	1.72E+03	NA	NA	3.29E+04		YES			6.54E+04		YES			1.92E+03	J	YES		
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	2.02E+01				YES	1.14E+01				YES	2.39E+01	J		YES	YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	4.60E+00	J				1.50E+00	J				ND				
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	9.90E+00					5.70E+00					4.73E+01	J	YES		YES
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	9.26E+03			YES	YES	3.64E+03			YES	YES	4.07E+04	J	YES	YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.92E+01					8.80E+00					1.64E+01	J			
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	1.38E+04		YES			1.03E+04		YES			7.80E+03	J	YES		
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	1.05E+02				YES	1.16E+02				YES	1.05E+02				YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	4.30E-02					1.90E-02	B				1.30E-02	B			
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	1.23E+01		YES			5.60E+00					5.16E+01	J	YES		YES
Potassium	mg/kg	8.00E+02	NA	NA	2.11E+02	J				2.63E+02	J				5.60E+02				
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	ND					ND					1.70E+00		YES		YES
Silver	mg/kg	3.60E-01	3.91E+01	2.00E+00	ND					ND					2.60E+00	J	YES		YES
Sodium	mg/kg	6.34E+02	NA	NA	1.08E+02	B				1.06E+02	B				1.14E+02	J			
Thallium	mg/kg	3.43E+00	5.08E-01	1.00E+00	ND					ND					4.50E-01	J			
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	1.49E+01				YES	8.90E+00				YES	3.80E+00	J			YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	3.45E+01					3.30E+01					1.28E+02		YES		YES
VOLATILE ORGANIC COMPOUNDS																			
1,2,4-Trimethylbenzene	mg/kg	NA	3.88E+02	1.00E-01	ND					ND					ND				
2-Butanone	mg/kg	NA	4.66E+03	8.96E+01	5.60E-03	J				3.60E-03	J				ND				
Acetone	mg/kg	NA	7.76E+02	2.50E+00	2.60E-02	J				5.80E-02	J				6.40E-02	J			
Bromomethane	mg/kg	NA	1.09E+01	NA	ND					ND					1.40E-03	B			
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	3.70E-03	B				3.10E-03	B				3.60E-03	B			
Naphthalene	mg/kg	NA	1.55E+02	1.00E-01	ND					ND					ND				
Toluene	mg/kg	NA	1.55E+03	5.00E-02	2.20E-03	J				2.40E-03	J				ND				
n-Butylbenzene	mg/kg	NA	7.77E+01	NA	ND					ND					ND				

Table 5-1

Surface Soil Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-85-GP07					PPMP-85-GP08					PPMP-85-GP09				
Parcel					PPMP-85					PPMP-85					PPMP-85				
Sample Number					KN0015					KN0017					KN0019				
Sample Date					1-Feb-99					1-Feb-99					15-Jan-99				
Sample Depth (Feet)					1-2					1-2					0.5-1.5				
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
SEMIVOLATILE ORGANIC COMPOUNDS																			
2-Methylnaphthalene	mg/kg	NA	1.55E+02	NA	ND					2.50E-01	J				ND				
Acenaphthene	mg/kg	7.02E-01	4.63E+02	2.00E+01	ND					ND					ND				
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	ND					ND					ND				
Anthracene	mg/kg	9.35E-01	2.33E+03	1.00E-01	ND					ND					ND				
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	ND					4.20E-02	J				ND				
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	ND					ND					ND				
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	ND					ND					ND				
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	ND					ND					ND				
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	ND					ND					ND				
Carbazole	mg/kg	NA	3.11E+01	NA	ND					4.10E-02	J				ND				
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	8.10E-02	J				6.40E-02	J				ND				
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	2.00E+02	ND					ND					7.90E-02	B			
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	ND					ND					ND				
Dibenzofuran	mg/kg	NA	3.09E+01	NA	ND					5.10E-02	J				ND				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	ND					4.10E-02	J				ND				
Fluorene	mg/kg	6.67E-01	3.09E+02	1.22E+02	ND					ND					ND				
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	ND					ND					ND				
Naphthalene	mg/kg	3.30E-02	1.55E+02	1.00E-01	ND					1.60E-01	J	YES		YES	ND				
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	ND					1.20E-01	J			YES	ND				
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	ND					4.90E-02	J				ND				
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	ND					ND					6.60E-02	B			
PESTICIDES																			
4,4'-DDD	mg/kg	NA	2.54E+00	2.50E-03	ND					ND					ND				
4,4'-DDE	mg/kg	NA	1.79E+00	2.50E-03	1.00E-02	J			YES	ND					ND				
Endosulfan sulfate	mg/kg	NA	4.66E+01	3.58E-02	ND					ND					ND				
Heptachlor	mg/kg	NA	1.40E-01	1.00E-01	ND					ND					ND				
HERBICIDES																			
2,2-Dichloropropanoic Acid	mg/kg	NA	2.33E+02	1.00E-01	ND					ND					ND				

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

[a] Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama,* July. For SVOCs, value listed is the background screening value for soils adjacent to asphalt as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

[b] Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000), *Final Human H and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).
J - Result is greater than method detection limit but less than or equal to reporting limit.
mg/kg - Milligrams per kilogram.
NA - Not available.
ND - Not detected.
Qual - Data validation qualifier.

Table 5-2

Subsurface Soil Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PPMP-85-GP01				PPMP-85-GP02				PPMP-85-GP03			
Parcel				PPMP-85				PPMP-85				PPMP-85			
Sample Number				KN0004				KN0006				KN0008			
Sample Date				13-Jan-99				15-Jan-99				15-Jan-99			
Sample Depth (Feet)				3-6				1.5- 3				4-5			
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**
METALS															
Aluminum	mg/kg	1.36E+04	7.80E+03	1.68E+04		YES	YES	1.45E+04		YES	YES	1.75E+04		YES	YES
Arsenic	mg/kg	1.83E+01	4.26E-01	7.00E+00			YES	4.40E+00			YES	3.60E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	5.15E+02		YES		7.20E+01				1.11E+02			
Beryllium	mg/kg	8.60E-01	9.60E+00	4.10E+00		YES		1.20E+00		YES		2.30E+00		YES	
Cadmium	mg/kg	2.20E-01	6.25E+00	ND				6.70E-01		YES		7.80E-01		YES	
Calcium	mg/kg	6.37E+02	NA	5.60E+02	J			1.89E+03	J	YES		1.35E+03	J	YES	
Chromium	mg/kg	3.83E+01	2.32E+01	2.33E+01			YES	2.38E+01	J		YES	2.41E+01	J		YES
Cobalt	mg/kg	1.75E+01	4.68E+02	9.32E+01		YES		6.00E+00	J			2.60E+01	J	YES	
Copper	mg/kg	1.94E+01	3.13E+02	5.90E+01		YES		4.81E+01	J	YES		4.35E+01	J	YES	
Iron	mg/kg	4.48E+04	2.34E+03	4.09E+04			YES	3.66E+04	J		YES	3.75E+04	J		YES
Lead	mg/kg	3.85E+01	4.00E+02	3.20E+01				1.37E+01	J			1.52E+01	J		
Magnesium	mg/kg	7.66E+02	NA	6.11E+03		YES		5.29E+03	J	YES		7.03E+03	J	YES	
Manganese	mg/kg	1.36E+03	3.63E+02	2.26E+02				1.31E+02				1.73E+02			
Mercury	mg/kg	7.00E-02	2.33E+00	1.60E-02	J			2.60E-02	B			1.00E-02	J		
Nickel	mg/kg	1.29E+01	1.54E+02	1.10E+02		YES		4.96E+01	J	YES		7.66E+01	J	YES	
Potassium	mg/kg	7.11E+02	NA	3.76E+02	B			5.79E+02				6.98E+02			
Selenium	mg/kg	4.70E-01	3.91E+01	1.90E+00		YES		1.60E+00		YES		1.90E+00		YES	
Silver	mg/kg	2.40E-01	3.91E+01	2.90E+00		YES		2.60E+00	J	YES		2.40E+00	J	YES	
Sodium	mg/kg	7.02E+02	NA	5.64E+01	J			4.71E+01	J			8.46E+01	J		
Thallium	mg/kg	1.40E+00	5.08E-01	ND				8.40E-01	J		YES	4.80E-01	J		
Vanadium	mg/kg	6.49E+01	5.31E+01	ND				3.00E+00	J			4.00E+00	J		
Zinc	mg/kg	3.49E+01	2.34E+03	1.30E+02		YES		1.02E+02		YES		1.44E+02		YES	
VOLATILE ORGANIC COMPOUNDS															
2-Butanone	mg/kg	NA	4.66E+03	ND				ND				ND			
Acetone	mg/kg	NA	7.76E+02	2.80E-02	B			2.90E-01	J			6.00E-02	J		
Bromomethane	mg/kg	NA	1.09E+01	1.90E-03	B			2.10E-03	B			2.90E-03	B		
Methylene chloride	mg/kg	NA	8.41E+01	3.80E-03	B			3.60E-03	B			4.60E-03	B		
Naphthalene	mg/kg	NA	1.55E+02	ND				ND				ND			
Toluene	mg/kg	NA	1.55E+03	ND				ND				ND			
Trichlorofluoromethane	mg/kg	NA	2.33E+03	ND				ND				3.70E-03	J		
SEMIVOLATILE ORGANIC COMPOUNDS															
2-Methylnaphthalene	mg/kg	NA	1.55E+02	ND				ND				ND			
Benzo(a)pyrene	mg/kg	NA	8.51E-02	ND				ND				ND			
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	ND				6.00E-02	B			5.30E-02	B		
Phenanthrene	mg/kg	NA	2.32E+03	ND				ND				ND			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	ND				1.10E-01	B			1.10E-01	B		
PESTICIDES															
4,4'-DDE	mg/kg	NA	1.79E+00	ND				ND				ND			
gamma-BHC (Lindane)	mg/kg	NA	4.85E-01	ND				ND				ND			
HERBICIDES															
2,2-Dichloropropanoic Acid	mg/kg	NA	2.33E+02	ND				ND				1.40E-01			

Table 5-2

Subsurface Soil Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PPMP-85-GP04				PPMP-85-GP05				PPMP-85-GP06			
Parcel				PPMP-85				PPMP-85				PPMP-85			
Sample Number				KN0010				KN0012				KN0014			
Sample Date				15-Jan-99				15-Jan-99				1-Feb-99			
Sample Depth (Feet)				5-6				3-6				2-5			
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**
METALS															
Aluminum	mg/kg	1.36E+04	7.80E+03	1.74E+04		YES	YES	1.56E+04		YES	YES	9.13E+03			YES
Arsenic	mg/kg	1.83E+01	4.26E-01	4.70E+00			YES	4.20E+00			YES	4.90E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	1.37E+02				9.69E+01				1.25E+02			
Beryllium	mg/kg	8.60E-01	9.60E+00	1.60E+00		YES		1.20E+00		YES		9.10E-01		YES	
Cadmium	mg/kg	2.20E-01	6.25E+00	ND				ND				ND			
Calcium	mg/kg	6.37E+02	NA	1.40E+03	J	YES		1.43E+03	J	YES		1.71E+03		YES	
Chromium	mg/kg	3.83E+01	2.32E+01	2.31E+01	J			2.14E+01	J			1.29E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	3.90E+00	J			6.80E+00	J			6.20E+00	J		
Copper	mg/kg	1.94E+01	3.13E+02	3.29E+01	J	YES		3.26E+01	J	YES		2.69E+01		YES	
Iron	mg/kg	4.48E+04	2.34E+03	3.99E+04	J		YES	3.04E+04	J		YES	2.44E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	1.53E+01	J			1.63E+01	J			1.41E+01			
Magnesium	mg/kg	7.66E+02	NA	6.85E+03	J	YES		5.08E+03	J	YES		1.94E+03		YES	
Manganese	mg/kg	1.36E+03	3.63E+02	1.89E+02				2.02E+02				7.39E+01			
Mercury	mg/kg	7.00E-02	2.33E+00	2.40E-02	J			2.10E-02	J			4.30E-02			
Nickel	mg/kg	1.29E+01	1.54E+02	4.73E+01	J	YES		3.24E+01	J	YES		1.72E+01		YES	
Potassium	mg/kg	7.11E+02	NA	4.67E+02	J			5.76E+02	J			4.53E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	2.00E+00		YES		1.50E+00		YES		1.50E+00		YES	
Silver	mg/kg	2.40E-01	3.91E+01	2.50E+00	J	YES		2.00E+00	J	YES		ND			
Sodium	mg/kg	7.02E+02	NA	7.49E+01	J			7.82E+01	J			9.85E+01	B		
Thallium	mg/kg	1.40E+00	5.08E-01	ND				5.10E-01	J		YES	ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	3.90E+00	J			7.10E+00				2.35E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	9.46E+01		YES		7.72E+01		YES		4.80E+01		YES	
VOLATILE ORGANIC COMPOUNDS															
2-Butanone	mg/kg	NA	4.66E+03	ND				3.20E-03	J			ND			
Acetone	mg/kg	NA	7.76E+02	3.20E-02	J			1.30E-01	J			1.40E-01	J		
Bromomethane	mg/kg	NA	1.09E+01	1.50E-03	B			1.70E-03	B			ND			
Methylene chloride	mg/kg	NA	8.41E+01	3.10E-03	B			3.70E-03	B			3.80E-03	B		
Naphthalene	mg/kg	NA	1.55E+02	4.10E-03	J			ND				ND			
Toluene	mg/kg	NA	1.55E+03	ND				ND				ND			
Trichlorofluoromethane	mg/kg	NA	2.33E+03	ND				ND				ND			
SEMIVOLATILE ORGANIC COMPOUNDS															
2-Methylnaphthalene	mg/kg	NA	1.55E+02	ND				ND				7.00E-02	J		
Benzo(a)pyrene	mg/kg	NA	8.51E-02	ND				1.10E-01	J		YES	ND			
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	5.50E-02	B			6.60E-02	B			ND			
Phenanthrene	mg/kg	NA	2.32E+03	3.90E-02	J			ND				ND			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	4.40E-02	B			8.40E-02	B			ND			
PESTICIDES															
4,4'-DDE	mg/kg	NA	1.79E+00	ND				1.10E-03	J			ND			
gamma-BHC (Lindane)	mg/kg	NA	4.85E-01	5.80E-04	J			ND				ND			
HERBICIDES															
2,2-Dichloropropanoic Acid	mg/kg	NA	2.33E+02	ND				ND				ND			

Table 5-2

Subsurface Soil Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PPMP-85-GP07				PPMP-85-GP08				PPMP-85-GP09			
Parcel				PPMP-85				PPMP-85				PPMP-85			
Sample Number				KN0016				KN0018				KN0020			
Sample Date				1-Feb-99				1-Feb-99				15-Jan-99			
Sample Depth (Feet)				2-5				2-5				2.5- 4			
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**
METALS															
Aluminum	mg/kg	1.36E+04	7.80E+03	7.94E+03			YES	1.34E+04			YES	1.96E+04		YES	YES
Arsenic	mg/kg	1.83E+01	4.26E-01	4.80E+00			YES	3.80E+00			YES	3.40E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	4.86E+01				7.58E+01				1.77E+02			
Beryllium	mg/kg	8.60E-01	9.60E+00	1.80E+00		YES		1.50E+00		YES		2.40E+00		YES	
Cadmium	mg/kg	2.20E-01	6.25E+00	ND				ND				ND			
Calcium	mg/kg	6.37E+02	NA	7.24E+02		YES		6.97E+02		YES		5.75E+02	J		
Chromium	mg/kg	3.83E+01	2.32E+01	9.40E+00				1.54E+01				2.50E+01	J		YES
Cobalt	mg/kg	1.75E+01	4.68E+02	2.02E+01		YES		7.80E+00				3.49E+01	J	YES	
Copper	mg/kg	1.94E+01	3.13E+02	3.74E+01		YES		3.72E+01		YES		4.78E+01	J	YES	
Iron	mg/kg	4.48E+04	2.34E+03	2.03E+04			YES	3.16E+04			YES	4.16E+04	J		YES
Lead	mg/kg	3.85E+01	4.00E+02	1.56E+01				1.52E+01				1.46E+01	J		
Magnesium	mg/kg	7.66E+02	NA	4.39E+03		YES		5.97E+03		YES		9.00E+03	J	YES	
Manganese	mg/kg	1.36E+03	3.63E+02	7.40E+01				6.30E+01				2.84E+02			
Mercury	mg/kg	7.00E-02	2.33E+00	2.00E-02	B			1.30E-02	B			2.60E-02	B		
Nickel	mg/kg	1.29E+01	1.54E+02	5.91E+01		YES		4.00E+01		YES		9.17E+01	J	YES	
Potassium	mg/kg	7.11E+02	NA	1.37E+02	J			3.01E+02	J			6.08E+02			
Selenium	mg/kg	4.70E-01	3.91E+01	1.30E+00		YES		1.80E+00		YES		1.50E+00		YES	
Silver	mg/kg	2.40E-01	3.91E+01	ND				ND				2.60E+00	J	YES	
Sodium	mg/kg	7.02E+02	NA	8.37E+01	B			1.09E+02	B			1.90E+02	J		
Thallium	mg/kg	1.40E+00	5.08E-01	5.00E-01	J			6.00E-01	J		YES	4.60E-01	J		
Vanadium	mg/kg	6.49E+01	5.31E+01	1.67E+01				1.88E+01				4.20E+00	J		
Zinc	mg/kg	3.49E+01	2.34E+03	8.95E+01		YES		8.82E+01		YES		1.57E+02		YES	
VOLATILE ORGANIC COMPOUNDS															
2-Butanone	mg/kg	NA	4.66E+03	ND				ND				ND			
Acetone	mg/kg	NA	7.76E+02	6.10E-03	B			7.00E-03	B			4.80E-02	J		
Bromomethane	mg/kg	NA	1.09E+01	ND				ND				1.40E-03	B		
Methylene chloride	mg/kg	NA	8.41E+01	2.80E-03	B			3.20E-03	B			3.50E-03	B		
Naphthalene	mg/kg	NA	1.55E+02	ND				ND				ND			
Toluene	mg/kg	NA	1.55E+03	ND				ND				4.50E-02			
Trichlorofluoromethane	mg/kg	NA	2.33E+03	ND				ND				ND			
SEMIVOLATILE ORGANIC COMPOUNDS															
2-Methylnaphthalene	mg/kg	NA	1.55E+02	ND				ND				ND			
Benzo(a)pyrene	mg/kg	NA	8.51E-02	ND				ND				ND			
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	ND				ND				8.70E-02	B		
Phenanthrene	mg/kg	NA	2.32E+03	ND				ND				ND			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	ND				ND				7.90E-02	B		
PESTICIDES															
4,4'-DDE	mg/kg	NA	1.79E+00	ND				ND				ND			
gamma-BHC (Lindane)	mg/kg	NA	4.85E-01	ND				ND				ND			
HERBICIDES															
2,2-Dichloropropanoic Acid	mg/kg	NA	2.33E+02	ND				ND				ND			

Table 5-2

Subsurface Soil Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

[a] Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama,* July.

[b] Residential human health site-specific screening level (SSSL) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).
J - Result is greater than method detection limit but less than or equal to reporting limit.
mg/kg - Milligrams per kilogram.
NA - Not available.
ND - Not detected.
Qual - Data validation qualifier.

Table 5-3

Groundwater Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PPMP-85-GP01				PPMP-85-GP02				PPMP-85-GP03			
Parcel				PPMP-85				PPMP-85				PPMP-85			
Sample Number				KN3001				KN3004				KN3005			
Sample Date				24-Mar-99				24-Mar-99				24-Mar-99			
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**
METALS															
Aluminum	mg/L	2.34E+00	1.56E+00	5.18E-01	B			1.27E-01	B			1.10E+00			
Barium	mg/L	1.27E-01	1.10E-01	2.74E-02	J			1.88E-02	J			3.18E-02	J		
Calcium	mg/L	5.65E+01	NA	9.58E+01		YES		1.56E+02		YES		3.39E+02		YES	
Chromium	mg/L	NA	4.69E-03	ND				ND				9.70E-03	B		YES
Cobalt	mg/L	2.34E-02	9.39E-02	ND				ND				8.40E-03	J		
Iron	mg/L	7.04E+00	4.69E-01	6.62E-01			YES	7.42E-02	B			1.62E+00			YES
Magnesium	mg/L	2.13E+01	NA	5.68E+01		YES		9.42E+01		YES		2.06E+02		YES	
Manganese	mg/L	5.81E-01	7.35E-02	1.99E-01			YES	2.20E-01			YES	1.45E+00		YES	YES
Mercury	mg/L	NA	4.60E-04	1.00E-04	B			1.20E-04	B			9.90E-05	B		
Nickel	mg/L	NA	3.13E-02	ND				ND				1.74E-02	J		
Potassium	mg/L	7.20E+00	NA	1.34E+00	J			1.02E+00	J			1.15E+01		YES	
Sodium	mg/L	1.48E+01	NA	5.01E+01		YES		6.79E+01		YES		1.12E+02		YES	
VOLATILE ORGANIC COMPOUNDS															
Bromomethane	mg/L	NA	2.17E-03	1.30E-04	B			ND				ND			
Carbon tetrachloride	mg/L	NA	4.00E-04	ND				ND				ND			
Chloroform	mg/L	NA	1.15E-03	ND				ND				ND			
Toluene	mg/L	NA	2.59E-01	ND				ND				ND			
Trichloroethene	mg/L	NA	4.50E-03	ND				ND				ND			

Table 5-3

Groundwater Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PPMP-85-GP04				PPMP-85-GP05				PPMP-85-GP09			
Parcel				PPMP-85				PPMP-85				PPMP-85			
Sample Number				KN3006				KN3007				KN3008			
Sample Date				24-Mar-99				25-Mar-99				25-Mar-99			
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**	**Result**	**Qual**	**>BKG**	**>SSSL**
METALS															
Aluminum	mg/L	2.34E+00	1.56E+00	2.16E-01	B			2.59E-01	B			4.25E-01	B		
Barium	mg/L	1.27E-01	1.10E-01	2.66E-02	J			1.36E-01	J	YES	YES	1.68E-02	J		
Calcium	mg/L	5.65E+01	NA	1.13E+02		YES		6.37E+01		YES		1.88E+02		YES	
Chromium	mg/L	NA	4.69E-03	ND				ND				ND			
Cobalt	mg/L	2.34E-02	9.39E-02	ND				ND				ND			
Iron	mg/L	7.04E+00	4.69E-01	1.99E-01				9.58E+00		YES	YES	4.62E-01			
Magnesium	mg/L	2.13E+01	NA	6.42E+01		YES		4.91E+01		YES		1.23E+02		YES	
Manganese	mg/L	5.81E-01	7.35E-02	1.50E-01			YES	3.95E-01			YES	8.55E-02			YES
Mercury	mg/L	NA	4.60E-04	1.00E-04	B			1.10E-04	B			1.00E-04	B		
Nickel	mg/L	NA	3.13E-02	ND				ND				ND			
Potassium	mg/L	7.20E+00	NA	1.10E+00	J			2.10E+00	J			1.57E+00	J		
Sodium	mg/L	1.48E+01	NA	8.67E+01		YES		2.39E+01		YES		1.22E+02		YES	
VOLATILE ORGANIC COMPOUNDS															
Bromomethane	mg/L	NA	2.17E-03	ND				ND				ND			
Carbon tetrachloride	mg/L	NA	4.00E-04	ND				ND				1.30E-03			YES
Chloroform	mg/L	NA	1.15E-03	ND				ND				3.60E-04	B		
Toluene	mg/L	NA	2.59E-01	ND				ND				1.20E-04	J		
Trichloroethene	mg/L	NA	4.50E-03	ND				ND				1.20E-03			

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

[a] Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama,* July.

[b] Residential human health site-specific screening level (SSSL) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).
J - Result is greater than method detection limit but less than or equal to reporting limit.
mg/L - Milligrams per liter.
NA - Not available.
ND - Not detected.
Qual - Data validation qualifier.

Table 5-4

Surface Water Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-85-SW/SD01					PPMP-85-SW/SD02				
Parcel					PPMP-85					PPMP-85				
Sample Number					KN2001					KN2002				
Sample Date					26-Jan-99					26-Jan-99				
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
METALS														
Aluminum	mg/L	5.26E+00	1.53E+01	8.70E-02	3.81E-01				YES	2.49E-01				YES
Antimony	mg/L	NA	5.84E-03	1.60E-01	2.20E-03	J				ND				
Arsenic	mg/L	2.10E-03	7.30E-04	1.90E-01	ND					3.10E-03	J	YES	YES	
Barium	mg/L	7.53E-02	1.10E+00	3.90E-03	3.21E-02	J			YES	3.13E-02	J			YES
Beryllium	mg/L	3.00E-04	1.75E-02	5.30E-04	1.50E-04	B				1.20E-04	B			
Cadmium	mg/L	1.10E-03	6.80E-03	6.60E-04	6.80E-04	J			YES	7.60E-04	J			YES
Calcium	mg/L	2.52E+01	NA	1.16E+02	1.08E+01					1.49E+01				
Chromium	mg/L	1.11E-02	4.08E-02	1.10E-02	1.60E-03	J				1.50E-03	J			
Cobalt	mg/L	NA	9.31E-01	3.00E-03	ND					ND				
Copper	mg/L	1.27E-02	6.23E-01	6.54E-03	1.22E-02	B			YES	1.33E-02	B	YES		YES
Iron	mg/L	1.96E+01	4.70E+00	1.00E+00	1.01E+00				YES	9.39E-01				
Lead	mg/L	8.60E-03	1.50E-02	1.32E-03	3.00E-03	J			YES	3.70E-03				YES
Magnesium	mg/L	1.10E+01	NA	8.20E+01	2.55E+00	J				3.28E+00	J			
Manganese	mg/L	5.65E-01	6.40E-01	8.00E-02	1.19E-01				YES	2.14E-01				YES
Nickel	mg/L	2.24E-02	3.10E-01	8.77E-02	6.70E-03	J				ND				
Potassium	mg/L	2.56E+00	NA	5.30E+01	2.30E+00	J				2.97E+00	J	YES		
Selenium	mg/L	NA	7.82E-02	5.00E-03	4.50E-03	B				2.50E-03	B			
Silver	mg/L	NA	7.90E-02	1.00E-05	ND					ND				
Sodium	mg/L	3.44E+00	NA	6.80E+02	9.36E-01	J				1.03E+00	J			
Vanadium	mg/L	1.52E-02	7.90E-02	1.90E-02	ND					ND				
Zinc	mg/L	4.03E-02	4.65E+00	5.89E-02	8.99E-02		YES		YES	1.72E-01		YES		YES
SEMIVOLATILE ORGANIC COMPOUNDS														
Fluoranthene	mg/L	NA	9.35E-02	3.98E-02	ND					ND				
Phenanthrene	mg/L	NA	1.01E+00	6.30E-03	ND					ND				
Pyrene	mg/L	NA	1.12E-01	3.00E-04	ND					ND				
bis(2-Ethylhexyl)phthalate	mg/L	NA	5.17E-02	3.00E-04	ND					4.90E-03	J			YES

Table 5-4

Surface Water Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location / Parcel / Sample Number / Sample Date					PPMP-85-SW/SD03 PPMP-85 KN2003 26-Jan-99					PPMP-85-SW/SD04 PPMP-85 KN2004 26-Jan-99					PPMP-85-SW/SD05 PPMP-85 KN2005 25-Jan-99				
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
METALS																			
Aluminum	mg/L	5.26E+00	1.53E+01	8.70E-02	3.28E+00				YES	1.37E-01	B			YES	5.18E+00	J			YES
Antimony	mg/L	NA	5.84E-03	1.60E-01	1.20E-03	J				ND					1.80E-03	J			
Arsenic	mg/L	2.10E-03	7.30E-04	1.90E-01	2.80E-03	J	YES	YES		ND					3.80E-03	J	YES	YES	
Barium	mg/L	7.53E-02	1.10E+00	3.90E-03	1.99E-01	J	YES		YES	1.08E-01	J	YES		YES	9.63E-02	J	YES		YES
Beryllium	mg/L	3.00E-04	1.75E-02	5.30E-04	4.20E-04	B	YES			1.40E-04	B				4.70E-04	B	YES		
Cadmium	mg/L	1.10E-03	6.80E-03	6.60E-04	1.00E-03	J			YES	ND					6.00E-04	J			
Calcium	mg/L	2.52E+01	NA	1.16E+02	4.79E+01		YES			4.04E+01		YES			3.96E+01		YES		
Chromium	mg/L	1.11E-02	4.08E-02	1.10E-02	6.90E-03	J				5.90E-04	J				6.90E-03	J			
Cobalt	mg/L	NA	9.31E-01	3.00E-03	5.10E-03	J			YES	ND					6.40E-03	J			YES
Copper	mg/L	1.27E-02	6.23E-01	6.54E-03	3.04E-02	B	YES		YES	4.30E-03	B				1.42E-02	B	YES		YES
Iron	mg/L	1.96E+01	4.70E+00	1.00E+00	3.36E+00				YES	1.09E-01					8.98E+00	J		YES	YES
Lead	mg/L	8.60E-03	1.50E-02	1.32E-03	5.86E-02		YES	YES	YES	ND					2.58E-02	J	YES	YES	YES
Magnesium	mg/L	1.10E+01	NA	8.20E+01	8.97E+00					6.78E+00					1.11E+01	J	YES		
Manganese	mg/L	5.65E-01	6.40E-01	8.00E-02	8.79E-02				YES	2.00E-03	J				2.23E-01	J			YES
Nickel	mg/L	2.24E-02	3.10E-01	8.77E-02	9.20E-03	J				ND					5.80E-03	J			
Potassium	mg/L	2.56E+00	NA	5.30E+01	1.76E+00	J				1.18E+00	B				3.09E+00	J	YES		
Selenium	mg/L	NA	7.82E-02	5.00E-03	4.10E-03	B				ND					4.00E-03	B			
Silver	mg/L	NA	7.90E-02	1.00E-05	5.20E-04	J			YES	ND					ND				
Sodium	mg/L	3.44E+00	NA	6.80E+02	1.31E+00	J				1.29E+00	J				1.05E+01	J	YES		
Vanadium	mg/L	1.52E-02	7.90E-02	1.90E-02	1.01E-02	B				5.00E-03	B				1.40E-02	B			
Zinc	mg/L	4.03E-02	4.65E+00	5.89E-02	1.91E-01		YES		YES	9.80E-03	J				8.03E-02	J	YES		YES
SEMIVOLATILE ORGANIC COMPOUNDS																			
Fluoranthene	mg/L	NA	9.35E-02	3.98E-02	ND					ND					7.30E-03	J			
Phenanthrene	mg/L	NA	1.01E+00	6.30E-03	ND					ND					4.20E-03	J			
Pyrene	mg/L	NA	1.12E-01	3.00E-04	ND					ND					5.10E-03	J			YES
bis(2-Ethylhexyl)phthalate	mg/L	NA	5.17E-02	3.00E-04	ND					ND					9.80E-03	J			YES

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

[a] Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama,* July.

[b] Recreational site user site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).
J - Result is greater than method detection limit but less than or equal to reporting limit.
mg/L - Milligrams per liter.
NA - Not available.
ND - Not detected.
Qual - Data validation qualifier.

Table 5-5

Sediment Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-85-SW/SD01					PPMP-85-SW/SD02				
Parcel					PPMP-85					PPMP-85				
Sample Number					KN1001					KN1004				
Sample Date					26-Jan-99					26-Jan-99				
Sample Depth (Feet)					0 - 0.5					0 - 0.5				
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
METALS														
Aluminum	mg/kg	8.59E+03	1.15E+06	NA	1.24E+04		YES			6.89E+03				
Antimony	mg/kg	7.30E-01	4.22E+02	1.20E+01	5.60E-01	J				1.10E+00	J	YES		
Arsenic	mg/kg	1.13E+01	5.58E+01	7.24E+00	7.50E+00				YES	1.05E+01				YES
Barium	mg/kg	9.89E+01	8.36E+04	NA	1.15E+02		YES			1.10E+02		YES		
Beryllium	mg/kg	9.70E-01	1.50E+02	NA	1.20E+00	B	YES			8.00E-01	B			
Cadmium	mg/kg	4.30E-01	1.71E+02	1.00E+00	2.50E-01	J				5.50E-01	J	YES		
Calcium	mg/kg	1.11E+03	NA	NA	2.94E+03		YES			3.43E+03		YES		
Chromium	mg/kg	3.12E+01	2.79E+03	5.23E+01	1.86E+01					1.72E+01				
Cobalt	mg/kg	1.10E+01	6.72E+04	5.00E+01	1.01E+01	J				8.60E+00				
Copper	mg/kg	1.71E+01	4.74E+04	1.87E+01	2.27E+01	J	YES		YES	1.96E+01	J	YES		YES
Iron	mg/kg	3.53E+04	3.59E+05	NA	2.68E+04					2.05E+04				
Lead	mg/kg	3.78E+01	4.00E+02	3.02E+01	3.52E+01				YES	6.13E+01		YES		YES
Magnesium	mg/kg	9.06E+02	NA	NA	1.06E+03	J	YES			8.09E+02				
Manganese	mg/kg	7.12E+02	4.38E+04	NA	9.78E+01	J				2.03E+02	J			
Mercury	mg/kg	1.10E-01	2.99E+02	1.30E-01	1.20E-01	J	YES			7.00E-02	J			
Nickel	mg/kg	1.30E+01	1.76E+04	1.59E+01	1.54E+01	B	YES			1.05E+01	B			
Potassium	mg/kg	1.01E+03	NA	NA	9.95E+02	B				5.51E+02	B			
Selenium	mg/kg	7.20E-01	5.96E+03	NA	2.10E+00		YES			1.90E+00		YES		
Silver	mg/kg	3.20E-01	6.07E+03	2.00E+00	ND					1.00E-01	J			
Sodium	mg/kg	6.92E+02	NA	NA	1.02E+02	B				5.38E+01	B			
Thallium	mg/kg	1.30E-01	7.78E+01	NA	1.90E+00	B	YES			ND				
Vanadium	mg/kg	4.09E+01	4.83E+03	NA	3.73E+01					2.70E+01				
Zinc	mg/kg	5.27E+01	3.44E+05	1.24E+02	9.22E+01	J	YES			2.51E+02	J	YES		YES
VOLATILE ORGANIC COMPOUNDS														
Acetone	mg/kg	NA	1.03E+05	4.53E-01	6.40E-02	J				ND				
Bromomethane	mg/kg	NA	1.43E+03	NA	3.60E-03	J				ND				
Methylene chloride	mg/kg	NA	9.84E+03	1.26E+00	5.10E-03	B				3.90E-03	B			
Toluene	mg/kg	NA	2.11E+05	6.70E-01	3.60E-03	J				ND				
p-Cymene	mg/kg	NA	2.08E+05	NA	4.10E-02	J				ND				

Table 5-5

Sediment Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-85-SW/SD01					PPMP-85-SW/SD02				
Parcel					PPMP-85					PPMP-85				
Sample Number					KN1001					KN1004				
Sample Date					26-Jan-99					26-Jan-99				
Sample Depth (Feet)					0 - 0.5					0 - 0.5				
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
SEMIVOLATILE ORGANIC COMPOUNDS														
Acenaphthylene	mg/kg	NA	5.59E+04	3.30E-01	ND					ND				
Benzo(a)anthracene	mg/kg	NA	8.93E+01	3.30E-01	ND					6.20E-02	J			
Benzo(a)pyrene	mg/kg	NA	8.93E+00	3.30E-01	ND					6.30E-02	J			
Benzo(b)fluoranthene	mg/kg	NA	8.93E+01	6.55E-01	9.90E-02	J				1.40E-01	J			
Benzo(ghi)perylene	mg/kg	NA	2.79E+04	6.55E-01	ND					ND				
Benzo(k)fluoranthene	mg/kg	NA	8.93E+02	6.55E-01	ND					ND				
Chrysene	mg/kg	NA	9.79E+03	3.30E-01	ND					9.50E-02	J			
Dibenz(a,h)anthracene	mg/kg	NA	9.79E+00	3.30E-01	ND					ND				
Fluoranthene	mg/kg	NA	3.73E+04	3.30E-01	ND					1.30E-01	J			
Indeno(1,2,3-cd)pyrene	mg/kg	NA	8.93E+01	6.55E-01	ND					ND				
Phenanthrene	mg/kg	NA	2.79E+05	3.30E-01	ND					ND				
Pyrene	mg/kg	NA	3.06E+04	3.30E-01	ND					1.10E-01	J			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	5.41E+03	1.82E-01	9.50E-02	B				6.30E-02	B			
PESTICIDES														
4,4'-DDD	mg/kg	NA	2.35E+02	3.30E-03	ND					ND				
4,4'-DDE	mg/kg	NA	1.66E+02	3.30E-03	ND					4.10E-03				YES
4,4'-DDT	mg/kg	NA	1.66E+02	3.30E-03	ND					ND				
HERBICIDES														
2,2-Dichloropropanoic Acid	mg/kg	NA	2.99E+04	NA	ND					ND				

Table 5-5

Sediment Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-85-SW/SD03					PPMP-85-SW/SD04					PPMP-85-SW/SD05				
Parcel					PPMP-85					PPMP-85					PPMP-85				
Sample Number					KN1005					KN1006					KN1007				
Sample Date					26-Jan-99					26-Jan-99					25-Jan-99				
Sample Depth (Feet)					0 - 0.5					0 - 0.5					0 - 0.5				
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
METALS																			
Aluminum	mg/kg	8.59E+03	1.15E+06	NA	8.90E+03		YES			8.38E+03					7.02E+03				
Antimony	mg/kg	7.30E-01	4.22E+02	1.20E+01	1.60E+00	J	YES			1.10E+00	J	YES			7.80E-01	B	YES		
Arsenic	mg/kg	1.13E+01	5.58E+01	7.24E+00	8.70E+00				YES	6.60E+00					1.42E+01		YES		YES
Barium	mg/kg	9.89E+01	8.36E+04	NA	1.75E+02		YES			1.02E+02		YES			4.37E+01				
Beryllium	mg/kg	9.70E-01	1.50E+02	NA	9.00E-01	B				9.10E-01	B				1.00E+00	B	YES		
Cadmium	mg/kg	4.30E-01	1.71E+02	1.00E+00	1.70E+00		YES		YES	1.10E+00		YES		YES	5.20E-01	J	YES		
Calcium	mg/kg	1.11E+03	NA	NA	5.16E+03		YES			3.09E+03		YES			2.77E+03		YES		
Chromium	mg/kg	3.12E+01	2.79E+03	5.23E+01	2.73E+01					1.59E+01					1.58E+01				
Cobalt	mg/kg	1.10E+01	6.72E+04	5.00E+01	1.57E+01		YES			1.56E+01		YES			1.50E+01		YES		
Copper	mg/kg	1.71E+01	4.74E+04	1.87E+01	7.49E+01	J	YES		YES	5.40E+01	J	YES		YES	3.07E+01	J	YES		YES
Iron	mg/kg	3.53E+04	3.59E+05	NA	2.52E+04					2.06E+04					3.76E+04		YES		
Lead	mg/kg	3.78E+01	4.00E+02	3.02E+01	1.82E+02		YES		YES	1.08E+02		YES		YES	4.09E+01		YES		YES
Magnesium	mg/kg	9.06E+02	NA	NA	4.20E+03		YES			3.06E+03		YES			2.48E+03		YES		
Manganese	mg/kg	7.12E+02	4.38E+04	NA	1.11E+02	J				4.35E+01	J				2.11E+02	J			
Mercury	mg/kg	1.10E-01	2.99E+02	1.30E-01	1.30E-01	J	YES		YES	9.00E-02	J				5.00E-02	J			
Nickel	mg/kg	1.30E+01	1.76E+04	1.59E+01	2.95E+01	B	YES		YES	2.71E+01	B	YES		YES	2.07E+01	B	YES		YES
Potassium	mg/kg	1.01E+03	NA	NA	6.00E+02	B				5.16E+02	B				4.60E+02	B			
Selenium	mg/kg	7.20E-01	5.96E+03	NA	1.20E+00		YES			1.20E+00		YES			1.40E+00		YES		
Silver	mg/kg	3.20E-01	6.07E+03	2.00E+00	2.40E+00		YES		YES	9.80E-01	J	YES			ND				
Sodium	mg/kg	6.92E+02	NA	NA	5.77E+01	B				4.37E+01	B				5.32E+01	B			
Thallium	mg/kg	1.30E-01	7.78E+01	NA	ND					4.70E-01	B	YES			ND				
Vanadium	mg/kg	4.09E+01	4.83E+03	NA	2.17E+01					1.81E+01					1.91E+01				
Zinc	mg/kg	5.27E+01	3.44E+05	1.24E+02	4.99E+02	J	YES		YES	3.28E+02	J	YES		YES	2.13E+02	J	YES		YES
VOLATILE ORGANIC COMPOUNDS																			
Acetone	mg/kg	NA	1.03E+05	4.53E-01	ND					ND					ND				
Bromomethane	mg/kg	NA	1.43E+03	NA	ND					ND					ND				
Methylene chloride	mg/kg	NA	9.84E+03	1.26E+00	4.30E-03	B				4.80E-03	B				9.50E-03	B			
Toluene	mg/kg	NA	2.11E+05	6.70E-01	ND					ND					ND				
p-Cymene	mg/kg	NA	2.08E+05	NA	ND					ND					ND				

Table 5-5

Sediment Analytical Results
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-85-SW/SD03					PPMP-85-SW/SD04					PPMP-85-SW/SD05				
Parcel					PPMP-85					PPMP-85					PPMP-85				
Sample Number					KN1005					KN1006					KN1007				
Sample Date					26-Jan-99					26-Jan-99					25-Jan-99				
Sample Depth (Feet)					0 - 0.5					0 - 0.5					0 - 0.5				
Parameter	**Units**	**BKG[a]**	**SSSL[b]**	**ESV[b]**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**	**Result**	**Qual**	**>BKG**	**>SSSL**	**>ESV**
SEMIVOLATILE ORGANIC COMPOUNDS																			
Acenaphthylene	mg/kg	NA	5.59E+04	3.30E-01	ND					ND					1.20E-01	J			
Benzo(a)anthracene	mg/kg	NA	8.93E+01	3.30E-01	5.50E-02	J				2.40E-01	J				3.70E-01	J			YES
Benzo(a)pyrene	mg/kg	NA	8.93E+00	3.30E-01	ND					3.70E-01	J			YES	5.80E-01				YES
Benzo(b)fluoranthene	mg/kg	NA	8.93E+01	6.55E-01	1.30E-01	J				7.40E-01				YES	7.60E-01				YES
Benzo(ghi)perylene	mg/kg	NA	2.79E+04	6.55E-01	ND					2.40E-01	J				4.30E-01	J			
Benzo(k)fluoranthene	mg/kg	NA	8.93E+02	6.55E-01	ND					2.70E-01	J				2.80E-01	J			
Chrysene	mg/kg	NA	9.79E+03	3.30E-01	8.10E-02	J				4.20E-01	J			YES	4.20E-01	J			YES
Dibenz(a,h)anthracene	mg/kg	NA	9.79E+00	3.30E-01	ND					ND					1.30E-01	J			
Fluoranthene	mg/kg	NA	3.73E+04	3.30E-01	9.00E-02	J				2.30E-01	J				4.20E-01	J			YES
Indeno(1,2,3-cd)pyrene	mg/kg	NA	8.93E+01	6.55E-01	ND					2.40E-01	J				4.10E-01	J			
Phenanthrene	mg/kg	NA	2.79E+05	3.30E-01	ND					ND					8.80E-02	J			
Pyrene	mg/kg	NA	3.06E+04	3.30E-01	8.80E-02	J				3.90E-01	J			YES	3.70E-01	J			YES
bis(2-Ethylhexyl)phthalate	mg/kg	NA	5.41E+03	1.82E-01	7.40E-02	B				1.00E-01	B				ND				
PESTICIDES																			
4,4'-DDD	mg/kg	NA	2.35E+02	3.30E-03	ND					ND					1.10E-02	J			YES
4,4'-DDE	mg/kg	NA	1.66E+02	3.30E-03	3.80E-03				YES	4.40E-03				YES	ND				
4,4'-DDT	mg/kg	NA	1.66E+02	3.30E-03	ND					ND					6.30E-03	J			YES
HERBICIDES																			
2,2-Dichloropropanoic Acid	mg/kg	NA	2.99E+04	NA	ND					ND					6.60E-02				

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

[a] Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama,* July.

[b] Recreational site user site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000), Final *Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).
J - Result is greater than method detection limit but less than or equal to reporting limit.
mg/kg - Milligrams per kilogram.
NA - Not available.
ND - Not detected.
Qual - Data validation qualifier.

locations), nickel (three locations), selenium (three locations), silver (three locations), and zinc (one location), the concentrations of these metals were within the range of background values.

Volatile Organic Compounds. Eight VOCs were detected in surface soil samples collected at the DRMO Area, Parcel 85(7). The methylene chloride and bromomethane results, and two of the acetone results were flagged with a 'B' data qualifier, signifying that these compounds were also detected in an associated laboratory or field blank sample. The sample collected at PPMP-85-GP04 contained each of the detected VOCs.

The VOC concentrations in surface soils were below SSSLs and ESVs.

Semivolatile Organic Compounds. Twenty-one SVOCs, including sixteen PAH compounds and five non-PAH compounds, were detected in surface soil samples collected at the DRMO Area, Parcel 85(7). SVOCs were not detected in the soils collected from sample location PPMP-85-GP01. Sample locations PPMP-85-GP04, PPMP-85-GP03, and PPMP-85-GP02 contained twenty, fifteen, and fourteen SVOCs, respectively, of the twenty-one detected SVOCs. The bis(2-ethylhexyl)phthalate and the di-n-butyl phthalate results were flagged with a 'B' data qualifier, signifying that these compounds were also detected in an associated laboratory or field blank sample.

The concentration of the PAH benzo(a)pyrene exceeded the SSSL at four locations (PPMP-85-GP02, PPMP-85-GP03, PPMP-85-GP04, and PPMP-85-GP05) but was below the PAH background screening value.

The concentrations of the PAHs anthracene (PPMP-85-GP04), benzo(a)pyrene (four locations), fluoranthene (three locations), naphthalene (PPMP-85-GP04 and PPMP-85-GP08), phenanthrene (three locations), and pyrene (four locations) exceeded ESVs. However, with the exceptions of naphthalene (PPMP-85-GP04 and PPMP-85-GP08) and phenanthrene (PPMP-85-GP04), the concentrations of these compounds were below PAH background screening values. Because the samples at PPMP-85-GP04 and PPMP-85-GP08 were collected directly beneath asphalt, the naphthalene and phenanthrene results were compared to PAH background values for soil beneath asphalt. The naphthalene and phenanthrene concentrations were below PAH background values for soil beneath asphalt.

Pesticides. Four pesticides, including 4,4'-dichlorodiphenyldichloroethane (DDD), 4,4'-dichlorodiphenyldichloroethene (DDE), endosulfan sulfate, and heptachlor, were detected in surface soil samples collected at the DRMO Area, Parcel 85(7). Pesticides were not detected in samples collected at locations PPMP-85-GP03, PPMP-85-GP04, PPMP-85-GP08, and PPMP-85-GP09.

The pesticide concentrations in surface soils were below SSSLs. The concentrations of 4,4'-DDD (PPMP-85-GP02) and 4,4'-DDE (four locations) exceeded ESVs.

Herbicides. The herbicide 2,2-dichloropropanoic acid was detected in one surface soil sample (PPMP-85-GP04) collected at the DRMO Area, Parcel 85(7). The concentration of the herbicide was below the SSSL but exceeded the ESV.

5.2 Subsurface Soil Analytical Results

Nine subsurface soil samples were collected for chemical analyses at the DRMO Area, Parcel 85(7). Subsurface soil samples were collected at depths greater than 1 foot bgs at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and metals background screening values, as presented in Table 5-2.

Metals. Twenty-two metals were detected in subsurface soil samples collected at the DRMO Area, Parcel 85(7). The samples collected from locations PPMP-85-GP02 and PPMP-85-GP03 each contained all of the detected metals. Four of the mercury results, three of the sodium results, and one of the potassium results were flagged with a 'B' data qualifier, signifying that these metals were also detected in an associated laboratory or field blank sample.

The concentrations of five metals (aluminum, arsenic, chromium, iron, and thallium) exceeded SSSLs. With the exception of aluminum (six locations), the concentrations of these metals were below their respective background concentration. The aluminum results were within the range of background values (Appendix H).

Volatile Organic Compounds. Seven VOCs (2-butanone, acetone, bromomethane, methylene chloride, naphthalene, toluene, and trichlorofluoromethane) were detected in subsurface soil samples collected at the DRMO Area, Parcel 85(7). The bromomethane and methylene chloride results, and

three of the acetone results were flagged with a 'B' data qualifier, signifying that these compounds were also detected in an associated laboratory or field blank sample.

The VOC concentrations in subsurface soils were below SSSLs.

Semivolatile Organic Compounds. Five SVOCs, including 2-methylnaphthalene, benzo(a)pyrene, di-n-butyl phthalate, phenanthrene, and bis(2-ethylhexyl)phthalate, were detected in subsurface soil samples collected at the DRMO Area, Parcel 85(7). The di-n-butyl phthalate and the bis(2-ethylhexyl)phthalate results were flagged with a 'B' data qualifier signifying that these compounds were also detected in an associated laboratory or field blank sample. SVOCs were not detected at three locations and di-n-butyl phthalate and bis(2-thylhexyl)phthalate were the only detected SVOCs at three additional locations.

The benzo(a)pyrene concentration (0.1 mg/kg) exceeded the SSSL (0.085 mg/kg) at one sample location (PPMP-85-GP05).

Pesticides. The pesticides 4,4'-DDE (PPMP-85-GP05) and gamma-BHC (betahexachlorocyclo-hexane) (PPMP-85-GP04) were detected in one subsurface soil sample each at concentrations below SSSLs.

Herbicides. The herbicide 2,2-dichloropropanoic acid was detected in one subsurface soil sample (PPMP-85-GP03) collected at the DRMO Area, Parcel 85(7), at a concentration below the SSSL.

5.3 Groundwater Analytical Results

Six temporary monitoring wells were sampled at the DRMO Area, Parcel 85(7), at the locations shown on Figure 3-1. Analytical results were compared to residential human health SSSLs and metals background screening values, as presented in Table 5-3.

Metals. Twelve metals, including aluminum, barium, calcium, chromium, cobalt, iron, magnesium, manganese, mercury, nickel, potassium, and sodium, were detected in groundwater samples collected at the DRMO Area, Parcel 85(7). Five of the aluminum results, one of the chromium results, one of the iron results, and the mercury results were flagged with a 'B' data qualifier, signifying that these metals were also detected in an associated laboratory or field blank sample.

The concentrations of barium (PPMP-85-GP05), chromium (PPMP-85-GP03), iron (three locations), and manganese (six locations) exceeded SSSLs. With the exception of chromium, for which a background concentration was not available, the concentrations of these metals were below their respective background concentration or within the range of background values (Appendix H).

Volatile Organic Compounds. Bromomethane, carbon tetrachloride, chloroform, toluene, and trichloroethene were detected in groundwater samples collected at the DRMO Area, Parcel 85(7). The bromomethane and chloroform results were flagged with a 'B' data qualifier, signifying that these compounds were also detected in an associated laboratory or field blank sample. VOCs were not detected in the samples collected at locations PPMP-85-GP02, PPMP-85-GP03, PPMP-85-GP04, and PPMP-85-GP05 and bromomethane was the only detected VOC at sample location PPMP-85-GP01. Sample location PPMP-85-GP09 contained four of the five detected VOCs.

The concentration of carbon tetrachloride (0.0013 milligrams per liter [mg/L]) exceeded the SSSL (0.0004 mg/L) at one location (PPMP-85-GP09).

Semivolatile Organic Compounds. SVOCs were not detected in any of the groundwater samples collected at the DRMO Area, Parcel 85(7).

Pesticides. Pesticides were not detected in any of the groundwater samples collected at the DRMO Area, Parcel 85(7).

Herbicides. Herbicides were not detected in any of the groundwater samples collected at the DRMO Area, Parcel 85(7).

5.4 Surface Water Analytical Results

Five surface water samples were collected at the DRMO Area, Parcel 85(7), at the sample locations shown on Figure 3-1. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background screening values, as presented in Table 5-4.

Metals. Twenty-one metals were detected in surface water samples collected at the DRMO Area, Parcel 85(7). The beryllium, copper, selenium, vanadium, and one of the aluminum results were flagged

with a 'B' data qualifier, signifying that these metals were also detected in an associated laboratory or field blank sample.

Arsenic (three locations), iron (PPMP-85-SW/SD05), and lead (PPMP-85-SW/SD03 and PPMP-85-SW/SD05) were detected at concentrations exceeding SSSLs. However, with the exception of lead at one location (PPMP-85-SW/SD03), the concentrations of these metals were below their respective background concentration or within the range of background values (Appendix H).

Aluminum (five locations), barium (five locations), cadmium (three locations), copper (four locations), iron (four locations), lead (four locations), manganese (four locations), silver (PPMP-85-SW/SD03), and zinc (four locations) concentrations exceeded ESVs. However, with the exception of lead and zinc at sample location PPMP-85-SW/SD03, the concentrations of these metals were below their respective background concentration or within the range of background values.

Volatile Organic Compounds. VOCs were not detected in surface water samples collected at the DRMO Area, Parcel 85(7).

Semivolatile Organic Compounds. Fluoranthene, phenanthrene, and pyrene were detected in one surface water sample and bis(2-ethylhexyl)phthalate was detected in two surface water samples collected at the DRMO Area, Parcel 85(7). SVOCs were not detected at three locations, and bis(2-ethyhexyl)phthalate was the only detected SVOC at one additional location. Sample location PPMP-85-SW/SD05 contained each of the detected SVOCs. None of the SVOCs was detected at a concentration exceeding SSSLs. Pyrene (one location) and bis(2-ethylhexyl)phthalate (two locations) concentrations exceeded ESVs.

Pesticides. Pesticides were not detected in any of the surface water samples collected at the DRMO Area, Parcel 85(7).

Herbicides. Herbicides were not detected in any of the surface water samples collected at the DRMO Area, Parcel 85(7).

5.5 Sediment Analytical Results

Five sediment samples were collected at the DRMO Area, Parcel 85(7). Samples were collected from the upper 0.5 foot of sediment at the sample locations shown on Figure 3-1. Analytical results were compared to recreational site user human health SSSLs, ESVs, and metals background screening values, as presented in Table 5-5.

Metals. Twenty-three metals were detected in the sediment samples collected at the DRMO Area, Parcel 85(7). All twenty-three metals were detected in the sediment sample from PPMP-85-SW/SD04. The samples collected at PPMP-85-SW/SD01, PPMP-85-SW/SD02, and PPMP-85-SW/SD03 each contained twenty-two of the twenty-three detected metals. The beryllium, nickel, potassium, sodium, thallium, and one of the antimony results were flagged with a 'B' data qualifier, signifying that these metals were also detected in an associated laboratory or field blank sample.

The metal concentrations in sediments were below SSSLs. Arsenic (five locations), cadmium (two locations), copper (five locations), lead (five locations), mercury (PPMP-85-SW/SD03), nickel (three locations), silver (PPMP-85-SW/SD03), and zinc (four locations) concentrations exceeded ESVs. However, with the exceptions of copper, lead, silver (all at PPMP-85-SW/SD03), and zinc (four locations), the concentrations of these metals were below their respective background concentration or within the range of background values (Appendix H).

Volatile Organic Compounds. Acetone, bromomethane, methylene chloride, toluene, and p-cymene were detected in sediment samples collected at the DRMO Area, Parcel 85(7). The methylene chloride results were flagged with a 'B' data qualifier, signifying that this compound was also detected in an associated laboratory or field blank sample. In addition, methylene chloride was the only detected VOC at four sample locations. The sample collected at PPMP-85-SW/SD01 contained each of the detected VOCs.

The VOC concentrations in sediments were below SSSLs and ESVs.

Semivolatile Organic Compounds. Thirteen SVOCs, including twelve PAH compounds and one non-PAH compound, were detected in sediment samples collected at the DRMO Area, Parcel 85(7). The bis(2-ethylhexyl)phthalate results were flagged with a 'B' data qualifier, signifying that this compound was also detected in an associated laboratory or field blank sample. The majority of the

remaining SVOC results were flagged with a 'J' data qualifier indicating that the results were greater than the method detection limit but less than the RL. The sample collected at PPMP-85-SW/SD05 contained twelve of the thirteen detected SVOCs, all of which were PAH compounds. None of the detected SVOCs was present at a concentration exceeding SSSLs.

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, and pyrene were detected at concentrations exceeding ESVs at sample locations PPMP-85-SW/SD04 and/or PPMP-85-GP05.

Pesticides. Three pesticides, including 4,4'-DDD, 4,4'-DDE, and 4,4'-dichlorodiphenyl-trichloroethane (DDT), were detected in sediment samples collected at the DRMO Area, Parcel 85(7). The pesticide concentrations in sediments were below SSSLs.

The concentrations of 4,4'-DDD (PPMP-85-SW/SD05), 4,4'-DDE (three locations), and 4,4'-DDT (PPMP-85-SW/SD05) exceeded ESVs. The cumulative concentration of the pesticides detected in sediments was 0.0296 mg/kg.

Herbicides. The herbicide 2,2-dichloropropanoic acid was detected in one of the sediment samples (PPMP-85-SW/SD05) collected at the DRMO Area, Parcel 85(7), at a concentration below the SSSL. An ESV for 2,2-dichloropropanoic acid was not available.

Total Organic Carbon. Five sediment samples were collected and analyzed for TOC content. TOC content ranged from 24,700 mg/kg to 83,200 mg/kg. TOC results can be found in Appendix E.

Grain Size. Grain size distribution was determined in each of the five sediment samples collected. Grain size results can be found in Appendix E.

6.0 Summary and Conclusions and Recommendations

IT, under contract with USACE, completed an SI at the DRMO Area, Parcel 85(7), at FTMC in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site and, if present, whether the concentrations would present an unacceptable risk to human health or the environment. The SI at the DRMO Area, Parcel 85(7), consisted of the sampling and analyses of nine surface soil samples, nine subsurface soil samples, six groundwater samples, five surface water samples, and five sediment samples. In addition, six temporary groundwater monitoring wells were installed in the residuum groundwater zone to facilitate groundwater sample collection and to provide site-specific geological and hydrogeological characterization information.

The analytical results indicate that metals, VOCs, SVOCs, and chlorinated pesticides/herbicides were detected in the environmental media sampled. PCBs and organophosphorus pesticides were not detected in any of the media sampled. Analytical results were compared to the human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluations as part of the ongoing SIs being performed under the BRAC Environmental Restoration Program at FTMC. Additionally, metals results exceeding the SSSLs and ESVs were compared to media-specific background concentrations (SAIC, 1998), and SVOC concentrations exceeding SSSLs and ESVs in surface soils were compared to PAH background screening values (IT, 2000b).

The potential impact to human receptors is expected to be minimal. Although the site is projected for use as an industrial area, the soils and groundwater data were screened against residential human health SSSLs to evaluate the site for possible unrestricted future use. The metals that exceeded residential human health SSSLs, with a few exceptions, were within background concentrations or the range of background values, and thus, do not pose an unacceptable risk to future human receptors. The PAH compound benzo(a)pyrene was detected in four surface soil samples at concentrations exceeding the SSSL, but below the PAH background value. The benzo(a)pyrene concentration also exceeded the SSSL at one subsurface soil sample location. The VOC carbon tetrachloride was detected in one groundwater sample (PPMP-85-GP09) at a concentration (0.0013 mg/L) exceeding the residential human health SSSL (0.0004 mg/L) but below the EPA drinking water standard (0.005 mg/L). Carbon tetrachloride was not detected in any of the other wells installed at Parcel 85(7) (including two upgradient wells: PPMP-85-GP01 and PPMP-85-GP02) or in four downgradient wells installed at adjacent parcels (Figure 4-3) (IT, 2000c; IT, 2000d). The extent of the carbon tetrachloride

contamination is defined horizontally and is localized in the area of PPMP-85-GP09. Based on the low level and limited spatial distribution, carbon tetrachloride is not expected to pose a threat to human health.

Several metals were detected in site media at concentrations exceeding ESVs and background concentrations. In addition, the concentrations of several SVOCs, and a limited number of pesticides and herbicides exceeded ESVs in site media. However, the potential impact to ecological receptors is expected to be minimal based on site conditions. The site is asphalt-paved and fenced and is located in a well-developed area which is projected for industrial use. The site does not support viable ecological habitat. Consequently, the threat to potential ecological receptors is expected to be minimal.

Based on the results of the SI, past operations at the DRMO Area, Parcel 85(7), do not appear to have adversely impacted the environment. The metals and organic compounds detected in site media do not pose an unacceptable risk to human health or the environment. Therefore, IT recommends "No Further Action" and unrestricted land reuse at the DRMO Area, Parcel 85(7).

7.0 References

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ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

2,4-D	2,4-dichlorophenoxyacetic acid
2,4,5-T	2,4,5-trichlorophenoxyacetic acid
2,4,5-TP	silvex
3D	3D International Environmental Group
Abs	skin absorption
AC	hydrogen cyanide
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded
ACGIH	American Conference of Governmental Industrial Hygienists
ADEM	Alabama Department of Environmental Management
AEL	airborne exposure limit
AL	Alabama
amb.	amber
ANAD	Anniston Army Depot
APT	armor-piercing tracer
ASR	Archives Search Report
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
'B'	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)
BCT	BRAC Cleanup Team
BEHP	bis(2-ethylhexyl)phthalate
BFB	bromofluorobenzene
BG	Bacillus globigii
bgs	below ground surface
BHC	betahexachlorocyclohexane
bkg	background
bls	below land surface
BOD	biological oxygen demand
BRAC	Base Realignment and Closure
Braun	Braun Intertec Corporation
BTEX	benzene, toluene, ethyl benzene, and xylenes
BTOC	below top of casing
BW	biological warfare
BZ	breathing zone; 3-quinuclidinyl benzilate
C	ceiling limit value
Ca	carcinogen
CCAL	continuing calibration
CCB	continuing calibration blank
CD	compact disc
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
CG	carbonyl chloride (phosgene)
CFC	chlorofluorocarbon
ch	inorganic clays of high plasticity
CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
CK	cyanogen chloride
cl	inorganic clays of low to medium plasticity
Cl.	chlorinated
CLP	Contract Laboratory Program
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
Co-60	cobalt-60
COC	chain of custody
COE	Corps of Engineers
Con	skin or eye contact
CRL	certified reporting limit
CRZ	contamination reduction zone
Cs-137	cesium-137
CS	ortho-chlorobenzylidene-malononitrile
CSEM	conceptual site exposure model
ctr.	container
CWA	chemical warfare agent
CWM	chemical warfare material; clear, wide mouth
CX	dichloroformoxime
D	duplicate; dilution
DANC	decontamination agent, non-corrosive
ºC	degrees Celsius
ºF	degrees Fahrenheit
DCE	dichloroethene
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DEH	Directorate of Engineering and Housing
DEP	depositional soil
DI	deionized
DIMP	di-isopropylmethylphosphonate
DMMP	dimethylmethylphosphonate
DOD	U.S. Department of Defense
DP	direct-push
DPDO	Defense Property Disposal Office
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DRO	diesel range organics
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
E&E	Ecology and Environment, Inc.
EBS	environmental baseline survey
Elev.	elevation
EM	electromagnetic
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive and ordnance disposal
EODT	explosive and ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
ER	equipment rinsate
ESE	Environmental Science and Engineering, Inc.
ESV	ecological screening value
Exp.	explosives
E-W	east to west
EZ	exclusion zone
FB	field blank
FD	field duplicate
FedEx	Federal Express, Inc.
FFE	field flame expedient
Fil	filtered
Flt	filtered
FMP 1300	Former Motor Pool 1300
Foster Wheeler	Foster Wheeler Environmental Corporation
Frtn	fraction
FS	field split
ft	feet
ft/ft	feet per foot
FTA	Fire Training Area
FTMC	Fort McClellan
g	gram
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
gal	gallon
gal/min	gallons per minute
GB	sarin
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GC/MS	gas chromatograph/mass spectrometer
GFAA	graphite furnace atomic absorption
gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GS	ground scar
GSA	General Services Administration
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GST	ground stain
GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
HA	hand auger

List of Abbreviations and Acronyms *(Continued)*

HCl	hydrochloric acid
HD	distilled mustard
HDPE	high-density polyethylene
Herb.	herbicides
HNO_3	nitric acid
hr	hour
H&S	health and safety
HSA	hollow-stem auger
HTRW	hazardous, toxic, and radioactive waste
'I'	out of control, data rejected due to low recovery
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICS	interference check sample
ID	inside diameter
IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDW	investigation-derived waste
IMPA	isopropylmethyl phosphonic acid
in.	inch
Ing	ingestion
Inh	inhalation
IP	ionization potential
IPS	International Pipe Standard
IRDMIS	Installation Restoration Data Management Information System
ISCP	Installation Spill Contingency Plan
IT	IT Corporation
ITEMS	IT Environmental Management System ™
'J'	estimated concentration
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes
K	conductivity
L	lewisite; liter
LC_{50}	lethal concentration for 50 percent of population tested
LD_{50}	lethal dose for 50 percent of population tested
l	liter
LCS	laboratory control sample
LEL	lower explosive limit
LT	less than the certified reporting limit
max	maximum
MDL	method detection limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils
MHz	megahertz
µg/g	micrograms per gram
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µmhos/cm	micromhos per centimeter
min	minimum
MINICAMS	miniature continuous air sampling system
ml	inorganic silts and very fine sands
mL	milliliter
mm	millimeter
MM	mounded material
MOGAS	motor vehicle gasoline
MPA	methyl phosphonic acid
MR	molasses residue
MS	matrix spike
mS/cm	millisiemens per centimeter
MSD	matrix spike duplicate
msl	mean sea level
MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded
mV	millivolts
MW	monitoring well
N/A	not applicable; not available
NAD	North American Datum
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
ND	not detected
NE	no evidence; northeast
NFA	No Further Action
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
NIC	notice of intended change
NIOSH	National Institute for Occupational Safety and Health
No.	number
NOAA	National Oceanic and Atmospheric Administration
NR	not requested
ns	nanosecond
N-S	north to south
nT	nanotesla
NTU	nephelometric turbidity unit
O&G	oil and grease
OD	outside diameter
OE	ordnance and explosives
oh	organic clays of medium to high plasticity
ol	organic silts and organic silty clays of low plasticity
OP	organophosphorus
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OWS	oil/water separator
oz	ounce
PAH	polynuclear aromatic hydrocarbon
Parsons	Parsons Engineering Science, Inc.
Pb	lead
PCB	polychlorinated biphenyl
PCE	perchloroethene
PCP	pentachlorophenol
PDS	Personnel Decontamination Station
PEL	permissible exposure limit
Pest.	pesticide
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
POL	petroleum, oils, and lubricants
PP	peristaltic pump
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PPMP	Print Plant Motor Pool
ppt	parts per thousand
PSSC	potential site-specific chemical
pt	peat or other highly organic silts
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QAP	installation-wide quality assurance plan
QC	quality control
QST	QST Environmental Inc.
qty	quantity
Qual	qualifier
'R'	rejected; resample
RCRA	Resource Conservation and Recovery Act
RDX	cyclonite
ReB3	Rarden silty clay loams
REG	field sample
REL	recommended exposure limit
RFA	request for analysis
RI	remedial investigation
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
RTK	real-time kinematic
SAD	South Atlantic Division
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan
sc	clayey sands; sand-clay mixtures
Sch.	schedule
SD	sediment

SDG	sample delivery group
SDZ	safe distance zone; surface danger zone
SEMS	Southern Environmental Management & Specialties, Inc.
SFSP	site-specific field sampling plan
SGF	standard grade fuels
SHP	installation-wide safety and health plan
SI	site investigation
SL	standing liquid
sm	silty sands; sand-silt mixtures
SM	Serratia marcescens
SOP	standard operating procedure
sp	poorly graded sands; gravelly sands
SP	sump pump
Sr-90	strontium-90
Ss	stony rough land, sandstone series
SS	surface soil
SSC	site-specific chemical
SSHO	site safety and health officer
SSHP	site-specific safety and health plan
SSSL	site-specific screening level
STB	supertropical bleach
STEL	short-term exposure limit
STOLS	Surface Towed Ordnance Locator System®
Std. units	standard units
SU	standard unit
SVOC	semivolatile organic compound
SW	surface water
SW-846	U.S. EPA *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*
SZ	support zone
TAL	target analyte list
TAT	turn around time
TB	trip blank
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TCDF	tetrachlorodibenzofurans
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TERC	Total Environmental Restoration Contract
TIC	tentatively identified compound
TLV	threshold limit value
TN	Tennessee
TOC	top of casing; total organic carbon
TPH	total petroleum hydrocarbons
TRADOC	U.S. Army Training and Doctrine Command
TRPH	total recoverable petroleum hydrocarbons
TWA	time weighted average
UCL	upper confidence limit
UCR	upper certified range
'U'	not detected above reporting limit
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USACMLS	U.S. Army Chemical School
USAMPS	U.S. Army Military Police School
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
UXO	unexploded ordnance
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validation qualifier
VX	nerve agent (O-ethyl-S- [diisoproplaminoethyl]-methylphosphonothiolate)
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd^3	cubic yards

SAIC – Data Qualifiers, Codes and Footnotes, 1995 Remedial Investigation

N/A – Not analyzed

ND – Not detected

Boolean Codes

LT – Less than the certified reporting limit

Flagging Codes

9 – Non-demonstrated/validated method performed for USAEC

B – Analyte found in the method blank or QC blank

C – Analysis was confirmed

D – Duplicate analysis

I – Interfaces in sample make quantitation and/or identification to be suspicious

J – Value is estimated

K – Reported results are affected by interfaces or high background

N – Tentatively identified compound (match greater than 70%)

Q – Sample interference obscured peak of interest

R – Non-target compound analyzed for but not detected (GC/MS methods)

S – Non-target compound analyzed for and detected (GC/MS methods)

T – Non-target compound analyzed for but not detected (non GC/MS methods)

U – Analysis in unconfirmed

Z – Non-target compound analyzed for and detected (non-GC/MS methods)

Qualifiers

J – The low-spike recovery is low

N – The high-spike recovery is low

R – Data is rejected

APPENDIX A

SAMPLE COLLECTION LOGS AND ANALYSIS REQUEST/CHAIN-OF-CUSTODY RECORDS

APPENDIX B

BORING LOGS AND WELL CONSTRUCTION LOGS

APPENDIX C

WELL DEVELOPMENT LOGS

APPENDIX D

SURVEY DATA

Appendix D

Survey Data
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Northing	Easting	Ground Elevation (ft msl)	Top of Casing Elevation (ft msl)
PPMP-85-GP01	1172156.216	672811.424	800.06	801.59
PPMP-85-GP02	1172314.155	672954.774	800.82	801.53
PPMP-85-GP03	1172438.255	672620.485	797.76	798.71
PPMP-85-GP04	1172570.105	672636.195	796.07	798.25
PPMP-85-GP05	1172712.365	672811.044	798.10	800.56
PPMP-85-GP06	1172759.590	672917.440	800.21	NA
PPMP-85-GP07	1172439.925	672949.034	803.93	NA
PPMP-85-GP08	1172468.065	672847.794	804.16	NA
PPMP-85-GP09	1172341.215	672666.645	801.75	804.54
PPMP-85-SW/SD01	1172692.270	672996.980	802.19	NA
PPMP-85-SW/SD02	1172551.480	673007.620	800.85	NA
PPMP-85-SW/SD03	1172264.175	672951.844	798.53	NA
PPMP-85-SW/SD04	1172170.756	672891.764	798.36	NA
PPMP-85-SW/SD05	1172796.650	672873.510	795.88	NA

Horizontal coordinates referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum (NAD83), 1983

Elevations referenced to the North American Vertical Datum of 1988 (NAVD88).

ft msl - Feet mean sea level
NA - Not applicable.

APPENDIX E

SUMMARY OF VALIDATED ANALYTICAL DATA

APPENDIX F

DATA VALIDATION SUMMARY REPORT

Data Validation Summary Report
for the Site Investigation Performed at the
DRMO Area, Parcel 85(7)
Fort McClellan, Calhoun County, Alabama

1.0 Introduction

Level III data validation was performed on 100 percent of the environmental samples collected at Parcel 85. The analytical data consisted of six sample delivery groups (SDG), PK158501 through PK158506, which were analyzed by Quanterra Incorporated. Both soil and water matrices were validated. In addition, an evaluation of the field split (FS) data, which was analyzed by the U.S. Army Corps of Engineers-South Atlantic Division laboratory, is included in this report. The chemical parameters for which the samples were analyzed are identified below:

Parameter (Method)
Target Compound List (TCL) Volatile Organics by Gas Chromatography/Mass Spectrometry (GC) SW-846 8260B
TCL Semivolatiles by GC SW-846 8270C
Metals by SW-846 6010B and 7471A/7470A
Chlorinated Pesticides by SW-846 8081A
Organophosphorous Pesticides by SW-846 8141A
Polychlorinated biphenyls by SW-846 8082
Herbicides by SW-846 8151A
Wet Chemistry - Total Organic Carbon by SW-846 9060

2.0 Procedures

The sample data were validated following the logic identified in the February 1994 U.S. Environmental Protection Agency (EPA) *Contract Laboratory Program National Functional Guidelines For Inorganic Data Review* and *Contract Laboratory Program National Functional Guidelines For Organic Review* for all areas except blanks. *Region III Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses* (EPA, 1993) and *Region III National Functional Guidelines for Organic Data Review* (EPA, 1992) were applied to the areas associated with blank contamination. Specific quality control (QC) criteria, as identified in the quality assurance plan (QAP), analytical methods, and laboratory standard operating procedures (SOP), were applied to all sample results. As the result of the use of Update III SW-846 test methods for the analytical data and the application of the Contract Laboratory Program (CLP) guidelines during the validation process, there were instances where specific QC requirements for all target compounds were not defined. This primarily occurred in the organic, gas chromatography (GC) and GC/mass spectrometry calibration

areas, and is due to the fact that the analytical methods are "performance-based," and allows the use of average calibration responses in lieu of individual responses, defined by CLP protocol. In light of applying CLP guidelines to SW-846 methods and evaluating the usability of the data during the validation process, specific QC criteria were determined to address all target compounds, and are identified in this report for each parameter as well as in the validation checklists, which function as worksheets. All completed validation checklists are on file in the Knoxville office. For those analytical methods not addressed by the CLP and Region III guidelines, the validation was based on the method requirements (i.e.: SW-846, *Code of Federal Regulations*, SOP, QAP) and technical judgement following the logic of the CLP validation guidelines.

3.0 Summary of Data Validation Findings

The overall quality of the data was determined to be acceptable. The only rejected data ('R' qualified) was due to "poor performing" volatile compounds (ketones, some halogenated hydrocarbons, e.g.) which exhibited poor calibration responses in the associated calibration data, and samples that were reanalyzed and have more than one result reported. The 'R' qualifier was assigned to the samples with more than one set of results to indicate that a given result should not be used to characterize a particular constituent, or an analysis, for a given sample.

Individual validation reports have been prepared for each parameter in each SDG, and the overall results of the validation findings are summarized in this report. The validation qualifier data entry verification report (Attachment A) is also provided. This is a complete listing of all of the analytical results and the validation qualifiers assigned for Parcel 85 sites. It also identifies the 'use' column, which indicates which result to use in the event of a reanalysis. A listing of the validation qualifiers and the reason codes, along with their definitions, is also found in Attachment A. The following section highlights the key findings of the data validation for each analysis.

4.0 Analysis-Specific Data Validation Summaries

4.1 Volatile Organics by GC/Mass Spectrometry SW-846 8260B

Overall, the data are of good quality and are usable, as reported by the laboratory, with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all samples except for sample KN0004 from SDG PK158502. Extraction and analysis hold times were exceeded, which resulted in the estimation of all reported results (qualified 'UJ/J').

Initial and Continuing Calibration

All initial and continuing calibrations associated with the project samples met QC criteria, with the exceptions of the following:

- The following demonstrated a relative response factor (RRF) below 0.1 in the ICAL and/or CCAL: Nondetect results were rejected (qualified 'R'). Positive results were estimated (qualified 'J') unless 'B' qualified due to blank contamination:

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK158501	KN0005, KN0006, KN0007, KN0008, KN0009, KN0010, KN0011, KN0012, KN0019, KN0020	Acetone, 2-Butanone, 1,2-Dibromo-3-Chloropropane	**R/J
PK158502	KN0001, KN0002, KN0004	Acetone, 2-Butanone, 1,2-Dibromo-3-Chloropropane	*B/**R
PK158503	KN2005	Acetone, 2-Butanone, 1,2,3-Trichloropropane 1,2-Dibromo-3-Chloropropane	**R
PK158504	KN1001, KN1002, KN1004, KN1005, KN1006, KN1007	Acetone, 2-Butanone, 1,2-Dibromo-3-Chloropropane, Bromochloromethane	**R/J
PK158505	KN0013, KN0014, KN0015, KN0016, KN0017, KN0018	Acetone, 2-Butanone, Bromomethane	*B/**R/J
PK158506	KN3001, KN3002, KN3004, KN3005, KN3006, KN3007, KN3008	Acetone, 2-Butanone, 1,2-Dibromo-3-Chloropropane	**R
PK158506	KN3001, KN3002, KN3004, KN3005, KN3006	Bromochloromethane, Bromomethane, Dibromomethane	*B/**R

* 'B' qualifiers assigned to designate blank contamination, which are identification qualifiers, take precedence over estimating qualifiers, assigned due to quantitation.

** 'R' qualifiers take precedence over estimating qualifiers.

- The following exhibited individual ICAL %RSD>30 and/or CCAL %D>20: Nondetect results were estimated (qualified 'UJ') unless rejected (qualified 'R') due to ICAL/CCAL minimum RRF criteria not met. Positive results were estimated (qualified 'J') unless 'B' qualified due to blank contamination:

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK158501	KN0005, KN0006, KN0007, KN0008, KN0009, KN0010, KN0011, KN0012, KN0019, KN0020	Acetone, Naphthalene, Bromomethane 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene	*B/UJ/J
PK158502	KN0001, KN0002, KN0004	Acetone, Naphthalene, Bromomethane 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene, Dichlorodifluoromethane	*B/UJ/J
PK158503	KN2001, KN2002, KN2003, KN2004	Trichlorofluoromethane, 1,2,3-Trichlorobenzene, Hexachlorobutadiene	UJ
PK158503	KN2005	n-Propylbenzene, 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene, Naphthalene, 2-Hexanone	UJ
PK158504	KN1001, KN1002, KN1004, KN1005, KN1006	4-Methyl-2-pentanone, 2-Hexanone, Dichlorodifluoromethane, 1,2-Dibromo-3-Chloropropane, Naphthalene	*R/UJ
PK158504	KN1007	Acetone, 2-Hexanone	*R/UJ
PK158505	KN0013, KN0014, KN0015, KN0016, KN0017, KN0018	Bromomethane, Carbon Disulfide, Methylene Chloride, Chloromethane, Trichlorofluoromethane, 1,2,3-Trichlorobenzene, 1,2,4-Trichlorobenzene	*B/**R/UJ
PK158506	KN3001, KN3002, KN3004, KN3005, KN3006, KN3007, KN3008	Methylene Chloride, Naphthalene 1,2,3-Trichlorobenzene, Bromomethane	*B/**R/UJ
PK158506	KN3007, KN3008	1,2-Dibromo-3-Chloropropane, Carbon Disulfide, Dichlorodifluoromethane	**R/UJ
PK158506	KN3001, KN3002, KN3004, KN3005, KN3006	Chloromethane	UJ

* 'B' qualifiers assigned to designate blank contamination, which are identification qualifiers, take precedence over estimating qualifiers, assigned due to quantitation.

** 'R' qualifiers take precedence over estimating qualifiers.

Blanks

The 5X/10X rule for contaminants found in the associated equipment rinses, trip blanks, and method blanks was applied to all sample results. All were found to be acceptable with the exception of the following:

Note: 'B' qualifiers were applied to all of the following sample results.

SDG	Samples Affected	Analyte/Analytes	Associated Blank Contamination
PK158501	KN0005, KN0006, KN0007, KN0008, KN0009, KN0010, KN0011, KN0012, KN0019, KN0020	Bromomethane, Methylene Chloride	Method
PK158502	KN0001, KN0002, KN0004	Bromomethane, Acetone, Methylene Chloride	Method/ER
PK158504	KN1001, KN1002, KN1004, KN1005, KN1006, KN1007	Methylene Chloride	Method/ER
PK158505	KN0013, KN0014, KN0015, KN0016, KN0017, KN0018	Methylene Chloride	Method
PK158505	KN0013, KN0016, KN0018	Acetone	ER
PK158506	KN3001	Bromomethane	TB
PK158506	KN3008	Chloroform	ER

Surrogate Recoveries

All surrogate recoveries are within acceptable QC limits, with the following exceptions:

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK158504	KN1005, KN1006	Methylene Chloride	*B
PK158505	KN0015, KN0017	Acetone, 2-Butanone, Methylene Chloride, Toluene	*B/J

* 'B' qualifiers assigned to designate blank contamination, which are identification qualifiers, take precedence over estimating qualifiers, assigned due to quantitation.

** 'R' qualifiers take precedence over estimating qualifiers.

Matrix Spike/Matrix Spike Duplicate

Matrix spike (MS)/MS duplicate (MSD) and laboratory control sample (LCS) were performed for the project samples, and all QC criteria were met.

Field Duplicates

Original and field duplicate (FD) results were evaluated and no problems were noted with the exception of the following:

Note: Soil-50 percent criteria applied. Water-35 percent criteria applied.

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK158504	KN1001(original), KN1002 (duplicate)	p-Isopropyltoluene	J

Internal Standards

All internal standards met criteria with the exception of the following:

- All compounds associated with the internal standards listed in the table below were qualified as indicated.

SDG	Samples Affected	Internal Standard Outside QC Limits	Validation Qualifier
PK158501	KN0005, KN0008, KN0011, KN0012, KN0019	1,4-Dichlorobenzene-d4	**R/UJ/J
PK158504	KN1001, KN1002, KN1004, KN1005, KN1006, KN1007	1,4-Dichlorobenzene-d4	**R/UJ/J
PK158505	KN0013, KN0015, KN0017	1,4-Dichlorobenzene-d4	UJ

** 'R' qualifiers take precedence over estimating qualifiers.

Quantitation

Results quantified between the maximum detection limit (MDL) and the reporting limit (RL), which the lab qualified as 'J', were qualified as estimated 'J' unless blank contamination was present or the results were rejected. Results rejected in favor of a preferred result (e.g., due to dilution or reanalysis) were qualified as rejected 'R'.

4.2 Target Compound List Semivolatiles by GC/Mass Spectrometry SW-846 8270C

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all samples except for sample KN0004 from SDG PK158502, since extraction hold time was exceeded. All reported results for this sample were estimated (qualified 'UJ/J').

Initial and Continuing Calibration

All initial and continuing calibrations associated with the project samples met QC criteria with the exceptions of the following:

The following exhibited individual ICAL %RSD>30 and/or CCAL %D>20:

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK158501	KN0005, KN0006, KN0007, KN0008, KN0009, KN0010, KN0011, KN0012, KN0019, KN0020	Hexachlorocyclopentadiene	UJ
PK158502	KN0001, KN0002	2,4-Dinitrophenol	UJ
PK158502	KN0001	4,6-Dinitro-2-methylphenol	UJ
PK158503	KN2005	2,4-Dinitrophenol	UJ
PK158505	KN0013, KN0014, KN0015, KN0016, KN0017, KN0018	3-Nitroaniline, 4-Nitroaniline, Carbazole	UJ/J

Blanks

The 5X/10X rule for contaminants found in the associated equipment rinses and method blanks was applied to all sample results. All were found to be acceptable with the exception of the following:

Note: 'B' qualifiers were applied to all of the following sample results.

SDG	Samples Affected	Analyte/Analytes	Associated Blank Contamination
PK158501	KN0005, KN0006, KN0007, KN0008, KN0009, KN0010, KN0011, KN0012, KN0019, KN0020	Bis(2-ethylhexyl)phthalate, Di-n-butylphthalate	Method
PK158504	KN1001, KN1002, KN1004, KN1005, KN1006	Bis(2-ethylhexyl)phthalate	Method

* 'B' qualifiers assigned to designate blank contamination, which are identification qualifiers, take precedence over estimating qualifiers, assigned due to quantitation.

Surrogate Recoveries

All surrogate recoveries are within acceptable QC limits with the exception of the following sample with low surrogate recoveries:

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK158502	KN0001	All reported compounds	UJ

Matrix Spike/Matrix Spike Duplicate

Batch QC was performed for the project samples, and all QC criteria were met, with the exception of the following:

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK158502	KN0001, KN0002, KN0004	1,2,4-Trichlorobenzene, Acenaphthene, 2,4-Dinitrotoluene, Pyrene, 4-Nitrophenol	UJ

Laboratory Control Sample

All QC criteria were met for the LCS associated with the project samples.

Field Duplicates

Original and FD results were evaluated and no problems were noted.

Internal Standards

All internal standards met criteria.

Quantitation

Results quantified between the MDL and the RL, which the lab qualified as 'J', were qualified as estimated 'J' unless blank contamination was present or the results were rejected. Results rejected in favor of a preferred result (e.g., due to dilution or reanalysis) were qualified as rejected 'R'.

4.3 Metals by SW-846 6010B/7471A/7470A

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all samples.

Preservation

Sample KN2005 from SDG PK158503 was not properly preserved at the time of collection. It was acidified to the proper pH by the laboratory; however, since the sample was not properly preserved in the field, all reported results were estimated (qualified 'J/UJ').

Initial and Continuing Calibration

All initial and continuing calibrations associated with the project samples met QC criteria, with the exception of the following where the continuing calibration verification result exceeded 10 percent of the true value:

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK158502	KN0004	Cadmium	UJ

Blanks

The 5X rule for contaminants found in the associated equipment rinse, calibration, and method blanks was applied to all sample results. All were acceptable with the exceptions noted below:

Note: 'B' qualifiers were applied to all of the following sample results.

SDG	Samples Affected	Element/Elements	Associated Blank Contamination
PK158501	KN0011	Beryllium	Calibration
PK158501	KN0006, KN0019, KN0020	Mercury	Calibration
PK158502	KN0001, KN0002	Beryllium, Sodium, Zinc	Calibration/ER
PK158502	KN0004	Potassium	ER
PK158503	KN2001, KN2002, KN2003, KN2004, KN2005	Copper, Beryllium	Method/Calibration
PK158503	KN2001, KN2002, KN2003, KN2005	Selenium	Method/Calibration
PK158503	KN2003, KN2004, KN2005	Vanadium	Calibration
PK158503	KN2004	Aluminum	Calibration
PK158503	KN2004	Potassium	Calibration
PK158504	KN1001, KN1002, KN1004, KN1005, KN1006, KN1007	Beryllium, Potassium, Nickel, Sodium	Calibration/ER
PK158504	KN1001, KN1006	Thallium	ER
PK158504	KN1007	Antimony	Calibration
PK158505	KN0013, KN0014, KN0015, KN0016, KN0017, KN0018	Sodium	Method/Calibration/ER
PK158505	KN0016, KN0017, KN0018	Mercury	ER
PK158506	KN3001, KN3002, KN3004, KN3005, KN3006, KN3007, KN3008	Mercury	Method/Calibration
PK158506	KN3001, KN3002, KN3004, KN3006, KN3007, KN3008	Aluminum	Method/Calibration/ER
PK158506	KN3004	Iron	Calibration
PK158506	KN3005	Chromium	Calibration

* 'B' qualifiers assigned to designate blank contamination, which are identification qualifiers, take precedence over estimating qualifiers, assigned due to quantitation.

Matrix Spike/Matrix Spike Duplicate

Batch QC was performed for the project samples and all QC criteria were met, with the following exceptions:

SDG	Samples Affected	Element/Elements	Validation Qualifier
PK158501	KN0005, KN0006, KN0007, KN0008, KN0009, KN0010, KN0011, KN0012, KN0019, KN0020	Chromium, Calcium, Copper, Magnesium, Antimony, Lead, Silver	UJ/J
PK158502	KN0001, KN0002, KN0004	Antimony	UJ
PK158504	KN1001, KN1002, KN1004, KN1005, KN1006, KN1007	Copper, Manganese, Antimony, Zinc	*B/J

Laboratory Control Sample

All QC criteria were met for the LCS associated with the project sample analyses.

Interference Check Sample

All interference check sample percent recoveries, where applicable, were acceptable.

Inductively Coupled Plasma Serial Dilutions

All QC criteria were met with the exception of the following:

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK158501	KN0005, KN0006, KN0007, KN0008, KN0009, KN0010, KN0011, KN0012, KN0019, KN0020	Chromium, Iron, Nickel, Lead	J
PK158501	KN0005, KN0006, KN0008, KN0010, KN0012, KN0020	Cobalt	J

Field Duplicates

Original and FD results were evaluated and no problems were noted, with the exception of the following:

Note: Soil-50 percent criteria applied. Water-35 percent criteria applied.

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK158502	KN0001 (original), KN0002 (duplicate)	Calcium, Magnesium	J
PK158504	KN1001 (original), KN1002 (duplicate)	Nickel, Sodium, Copper, Mercury, Cadmium	J
PK158506	KN3001 (original), KN3002 (duplicate)	Aluminum	J

Sample Quantitation

Results quantified between the instrument detection limit and the RL ('B' flagged by the laboratory) were qualified as estimated ('J').

4.4 Chlorinated Pesticides by SW-846 8081A

Overall, the data are of good quality and are usable as reported by the laboratory, with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all samples.

Initial and Continuing Calibration

All initial and continuing calibrations associated with the project samples met QC criteria, with the exception of the following:

- Methoxychlor showed a large difference in the individual primary CCAL %D>15% and the confirmation %D>25% for sample KN1007 from SDG PK158504. Professional judgement was applied, which resulted in the estimation of methoxychlor results.

- The following exhibited individual primary CCAL %D>15% and/or confirmation %D>25%, or the % difference between the original and second column was >25% : Nondetect results were estimated (qualified 'UJ'). Positive results were estimated (qualified 'J') unless 'B' qualified due to blank contamination:

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK158504	KN1004, KN1005, KN1006, KN1007	4,4'-DDT, Methoxychlor	UJ/J
PK158504	KN1004, KN1005, KN1006	Beta-BHC, Endrin Ketone,	UJ
PK158504	KN1007	4,4'-DDD	J

Blanks

The 5X rule for contaminants found in the associated equipment rinses and method blanks was applied to all sample results. All were found to be acceptable.

Surrogate Recoveries

All surrogate recoveries are within acceptable QC limits with the exception of the following sample, which had high surrogate recoveries:

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK158504	KN1007	4,4'-DDD, 4,4'-DDT	J

Matrix Spike/Matrix Spike Duplicate

Batch QC was performed for the project samples and all QC criteria were, met with the exception of the following:

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK158502	KN0001, KN0002, KN0004	1,2,4-Trichlorobenzene, Acenaphthene,2,4-Dinitrotoluene, Pyrene, 4-Nitrophenol	UJ

Laboratory Control Sample

All QC criteria were met for the LCS associated with the project samples.

Field Duplicates

Original and FD results were evaluated and no problems were noted.

Quantitation

Results quantified between the MDL and the RL, which the lab qualified as 'J', were qualified as estimated 'J' unless blank contamination was present or the results were rejected. Results rejected in favor of a preferred result (e.g., due to dilution or reanalysis) were qualified as rejected 'R'.

4.5 Organophosphorous Pesticides by SW-846 8141A

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all samples except for SDG PK158505. All samples were qualified 'UJ/J' due to the analysis hold time being exceeded.

Initial and Continuing Calibration

All initial and continuing calibrations associated with the project samples met QC criteria, with the exceptions of the following:

- The following exhibited individual ICAL %RSD>20 : Nondetect results were estimated (qualified 'UJ'). Positive results were estimated (qualified 'J') unless 'B' qualified due to blank contamination:

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK158506	KN3001, KN3002, KN3004 KN3005, KN3006, KN3007, KN3008	Merphos	UJ
PK158506	KN3001, KN3002, KN3005, KN3006, KN3007	Demeton (Total), Azinphos-Methyl, Fensulfothion	UJ
PK158506	KN3004, KN3008	Naled	UJ

- The following exhibited individual primary CCAL %D>15% and/or confirmation %D>25%: Nondetect results were estimated (qualified 'UJ'). Positive results were estimated (qualified 'J') unless 'B' qualified due to blank contamination:

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK158501	KN0005, KN0007, KN0008, KN0009, KN0010, KN0011, KN0012	All reported compounds	UJ
PK158501	KN0006, KN0019, KN0020	Phorate	UJ
PK158504	KN1005, KN1006	Phorate, Merphos	UJ
PK158504	KN1007	All reported compounds	UJ
PK158506	KN3001, KN3002, KN3004, KN3005, KN3006, KN3007, KN3008	Merphos	UJ
PK158506	KN3001, KN3002, KN3005, KN3006, KN3007	Thionazin, Naled, Dimethoate, Sulfotepp, Famphur, Malathion, Parathion	UJ
PK158506	KN3004, KN3008	Demeton (Total), Diazinon, Ethoprop, Mevinphos, Dichlorvos, Ronnel, Azinphos-Methyl, Bolstar, Coumaphos, Disulfoton, Fensulfothion, Fenthion, Phorate, Methyl Parathion	UJ

Blanks

The 5X rule for contaminants found in the associated equipment rinses and method blanks was applied to all sample results. All were found to be acceptable.

Surrogate Recoveries

All surrogate recoveries are within acceptable QC ranges for the surrogates applied.

Matrix Spike/Matrix Spike Duplicate

MS/MSD and LCS were performed for the project samples, and all QC criteria were met.

Field Duplicates

Original and FD results were evaluated and no problems were identified.

Quantitation

Results quantified between the MDL and the RL, which the lab qualified as 'J', were qualified as estimated 'J' unless blank contamination was present or the results were rejected. Results rejected in favor of a preferred result (e.g., due to dilution or reanalysis) were qualified as rejected 'R'.

4.6 Polychlorinated Biphenyls by SW-846 8082

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all samples.

Initial and Continuing Calibration

All initial and continuing calibrations associated with the project samples met QC criteria.

Blanks

The 5X rule for contaminants found in the associated equipment rinses and method blanks was applied to all sample results. All were found to be acceptable.

Surrogate Recoveries

All surrogate recoveries are within acceptable QC ranges for the surrogates applied.

Matrix Spike/Matrix Spike Duplicate

MS/MSD and LCS were performed for the project samples, and all QC criteria were met.

Field Duplicates

Original and FD results were evaluated and no problems were identified.

Quantitation

Results quantified between the MDL and the RL, which the lab qualified as 'J', were qualified as estimated 'J' unless blank contamination was present or the results were rejected. Results rejected in favor of a preferred result (e.g., due to dilution or reanalysis) were qualified as rejected 'R'.

4.7 Herbicides by SW-846 8151A

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all project samples.

Initial and Continuing Calibration

All initial and continuing calibrations associated with the project samples met QC criteria.

Blanks

The 5X rule for contaminants found in the associated equipment rinses and method blanks was applied to all sample results. All were found to be acceptable.

Surrogate Recoveries

All surrogate recoveries are within acceptable QC ranges for the surrogates applied.

Matrix Spike/Matrix Spike Duplicate

Batch QC was performed for the project samples and all QC criteria were met, with the exception of the following:

SDG	Samples Affected	Analyte/Analytes	Validation Qualifier
PK158501	KN0005, KN0006, KN0007, KN0008, KN0009, KN0010, KN0011, KN0012, KN0019, KN0020	2,4-D, 2,4,5-TP (Silvex), 2,4,5-T	UJ
PK158504	KN1001, KN1002, KN1004, KN1005, KN1006, KN1007	2,4-D, 2,4,5-TP (Silvex), 2,4,5-T	UJ
PK158505	KN0013, KN0014, KN0015, KN0016, KN0017, KN0018	2,4,5-TP (Silvex), 2,4,5-T	UJ

Laboratory Control Sample

All QC criteria were met for the LCS associated with the project sample analyses.

Field Duplicates

Original and FD results were evaluated and no problems were identified.

Quantitation

Results quantified between the MDL and the RL, which the lab qualified as 'J', were qualified as estimated 'J' unless blank contamination was present or the results were rejected. Results rejected in favor of a preferred result (e.g., due to dilution or reanalysis) were qualified as rejected 'R'.

4.8 Total Organic Carbon by SW-846 9060

Overall, the data are of good quality and are usable as reported by the laboratory with the exceptions noted below. Data were reviewed for the following:

Holding Times

Technical holding time criteria were met for all samples.

Initial and Continuing Calibration

All initial and continuing calibrations associated with the project samples met QC criteria.

Blanks

The 5X rule for contaminants found in the associated equipment rinses and method blanks was applied to all sample results. All were found to be acceptable.

Matrix Spike/Matrix Spike Duplicate

MS/MSD and LCS were performed for the project samples, and all QC criteria were met.

Field Duplicates

Original and FD results were evaluated and no problems were noted.

Quantitation

Results quantified between the MDL and the RL, which the lab qualified as 'J', were qualified as estimated 'J' unless blank contamination was present or the results were rejected. Results rejected in favor of a preferred result (e.g., due to dilution or reanalysis) were qualified as rejected 'R'.

5.0 Quality Assurance Field Split Sample Data Evaluation

Data from the quality assurance split samples supplied to IT Corporation by the U.S. Army Corps of Engineers were reviewed for comparability to the original and FD results. RPDs were calculated, and the results are summarized in this section.

Field Split Data for SDG PK158502

Note: FS Laboratory - Specialized Assays, Inc., Nashville, Tennessee.

Original Sample ID	Field Duplicate ID	Field Split ID
KN0001	KN0002	KN0003

Comments:

- Metals: A majority of the same metals were detected in all three samples. Mercury, selenium, cobalt, silver, and beryllium were detected in the original and FD, but not in the FS. Sodium detected below the RL, and copper had RPDs above the 50 percent QC limit for soils. Differences attributed to nonhomogeneity in soil samples and/or FS lab not reporting results below the RL.

- Volatiles: No volatiles were detected in the FS sample. Methylene chloride and acetone (common laboratory contaminants) were detected below the RL in the original and FD sample. Naphthalene was found below the RL in the original sample. Differences attributed to nonhomogeneity in soil samples and/or FS lab not reporting results below the RL.

- Chlorinated Pesticides: No compounds were detected in the FD or FS. Heptachlor was detected below the RL in the original.

- Semivolatiles, polychlorinated biphenys (PCB), occupation physician pesticides, herbicides: No compounds were detected in the original sample, FD, r FS.

Field Split Data for SDG PK158504

Note: FS Laboratory - Specialized Assays, Inc., Nashville, Tennessee.

Original Sample ID	Field Duplicate ID	Field Split ID
KN1001	KN1002	KN1003

Comments:

- Metals: A majority of the same metals were detected in all three samples. Five of six metals not detected in all three samples were detected at less than the RL of the original. All metals except selenium have RPD values above the RL for soils. Differences attributed to lack of sample homogeneity, sampling sequence, and field activities in sampling and/or FS lab not reporting results below the RL.

- Volatiles: No volatiles were detected in the FS. Toluene, 2-butanone, acetone,and methylene chloride were detected below the RL in the original and/or FD. All are common laboratory contaminants. Differences attributed to nonhomogeneity in the soil samples and/or FS lab not reporting results below the RL.

- Semivolatiles: No semivolatiles were detected in the FS. Bis(2-ethylhexyl) phthalate and phenol (common laboratory contaminants) were detected below the RL in the original and FD. Benzo(b)fluoranthene and 4-methylphenol were also detected below the RL in the original and/or FD. Differences attributed to nonhomogeneity in the soil samples and/or FS lab not reporting results below the RL.

- Pesticides, organophosphorus pesticides, herbicides, PCBs: No compounds were detected in the original sample, FD, or FS.

Field Split Data for SDG PK158506

Note: FS Laboratory - Specialized Assays, Inc., Nashville, Tennessee.

Original Sample ID	Field Duplicate ID	Field Split ID
KN3001	KN3002	KN3003

Comments:

- Metals: A majority of the same metals were detected in all three samples. Mercury was detected at less than the reporting/quantitation limit in the original and FD, but not in the FS. Aluminum was the only metal with a RPD value above the QC limit for waters. Differences attributed to lack of possible sample homogeneity in sampling and/or FS lab not reporting results below the RL.

- Volatiles: No volatiles were detected in the FD or FS. Bromomethane was detected below the RL in the original sample. Differences attributed to nonhomogeneity in the samples and/or FS lab not reporting results below the RL.

- Semivolatiles, pesticides, organophosphorus pesticides, herbicides, PCBs: No compounds were detected in the original sample, FD or FS.

ATTACHMENT A

DATA VALIDATION QUALIFIER ENTRY VERIFICATION REPORT

APPENDIX G

VARIANCES

APPENDIX H

SUMMARY STATISTICS FOR BACKGROUND MEDIA
FORT McCLELLAN, ALABAMA